An Empirical Investigation on the Effect of Value-Added Services on Consumer Adoption of Mobile Payment in the UK

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By

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Abstract

Mobile payment (m-payment) is an innovative payment method that uses technology to enable consumers to pay for goods and services using their mobile devices. As an emerging payment method, m-payment is marketed as a secure and convenient alternative to traditional payment methods. Despite the purported advantages of m-payment, however, consumers in the UK and elsewhere have been slow to adopt it. This has been attributed to a perception that there is little or no added value to using m-payment compared to well-established existing payment methods. Augmenting m-payment with value-added services that offer additional functions to the core payment service has been suggested as a form of added value to promote adoption of m-payment, but there is little actual evidence to support this suggestion.

A considerable amount of research has been done to understand the factors that influence consumer adoption of m-payment, but there has been little investigation of the role of consumer perceived value in the context of m-payment adoption. The aim of the investigation reported in this thesis is to assess the effects of adding services beyond the payment service on m-payment adoption intention by consumers in the UK. The thesis addresses two primary issues: first, the research provides contextual understanding of the value of m-payment as seen from consumers' perspectives; second, the research evaluates empirically the ways consumers perceive added value and its impact on their intentions to use m-payment.

To address the above aim, this study adopted a mixed methods research approach involving two phases. The first phase used qualitative investigation based on a literature review and face to face interviews to develop a conceptual model and relevant measurement items. The second phase of research involved quantitative analysis of data collected in an online survey experiment designed to validate and assess the proposed conceptual model.

The findings suggest that consumers who had no previous experience of m-payment perceive its value as a trade-off between benefits and sacrifices through four determinants: convenience value, monetary value, enjoyment value, and perceived risk. Whilst the first three determinants are the purported benefits of using m-payment, perceived risk is sacrifice. The findings also indicate that augmenting m-payment with value-added services is likely to increase consumers' intention to use m-payment if they perceive net added value in terms of the balance of received benefits at given risk (sacrifice). However, the extent to which consumers perceive augmented m-payment as more attractive than their existing payment methods has been shown by this research to have greater influence on promoting intention to use m-payment than perceived net added value.

The research reported in this thesis offers a variety of theoretical contributions and practical implications. The principal theoretical contribution is to have developed, analysed and validated a

conceptual model that captures the impact of value-added services on the factors determining consumers' intentions to use m-payment. The practical implications of the research provide a foundation for guiding interventions by m-payment providers who wish to address the slow adoption of m-payment through value-added services. The research suggests that devising strategies that aim to increase utilitarian and/or hedonic benefits of m-payment solutions could be expected to increase perceptions of m-payment value and lead to favourable outcomes. Along with such strategies, investing in marketing efforts that reassure consumers about the security of m-payment solutions and highlight their added benefits compared to mainstream payment methods is of paramount importance in promoting adoption.

Declaration

The following publications have been produced during the course of this thesis:

Conference Paper

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Book Chapter

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List of Abbreviations

ATM	Automated Teller Machine
AVE	Average Variance Extracted
B2C	Business-to-Consumer
BBC	British Broadcasting Corporation
C2C	Consumer-to-Consumer
CA	Cronbach's Alpha
CB-SEM	Covariance-Based Structural Equation Modelling
CR	Composite Reliability
DOI	Diffusion of Innovations Theory
EMV	Europay, MasterCard, and Visa
HCE	Host Card Emulation
HTMT	Heterotrait-Monotrait Ratio
IVR	Interactive Voice Response
MNO	Mobile Network Operator
NFC	Near Field Communication
OTP	One-Time Password
P2P	Peer-to-Peer
PERVAL	Perceived Value Scale
PLS	Partial Least Squares
PLS-SEM	Partial Least Squares Structural Equation Modelling
RFID	Radio-Frequency Identification
SE	Secure Element
SEM	Structural Equation Modelling
SIM	Subscriber Identity Module
SMS	Short Message Service
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor
WAP	Wireless Application Protocol

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Chapter 1 Introduction

1.1 Overview

The rapid evolution of smartphone technologies along with the availability of highly reliable wireless communication have enabled the mobile phone to become a significant role player in the delivery of content, goods and services to consumers. In particular, the high penetration rate of smartphones has attracted businesses to embrace the ubiquity of such devices by developing applications that serve consumers' needs anywhere and establish a presence in an always-on channel. Mobile payment (m-payment) is one example of such applications and is broadly defined as "any payment where a mobile device is used to initiate, authorise and confirm an exchange of financial value in return for goods and services" (Au and Kauffman, 2008). The term m-payment has been used as an umbrella term encompassing two main types of payment: remote and proximity (Karnouskos and Fokus, 2004; Chandra, Srivastava and Theng, 2010). As the name suggests, remote m-payment is conducted over the Internet and includes B2C (Business-To-Consumer) and C2C (Consumer-To-Consumer) payments. Examples of B2C payments include mobile commerce transactions made through mobile apps or mobile-based web browsers, whereas C2C payments mainly represent peer-to-peer (P2P) payment applications that facilitate money transfer transactions between two consumers (Kreyer, Pousttchi and Turowski, 2002; Chandra, *et al.*, 2010; Slade, Dwivedi, *et al.*, 2015). To perform a remote m-payment, consumers provide their payment information either manually or through a pre-stored instance on the merchant's platform. Consumers can also use third-party payment providers where accepted, such as PayPal, to provide their payment details (Slade, Dwivedi, *et al.*, 2015).

As opposed to remote m-payment, proximity m-payment requires a local communication to transmit the payment information between the mobile device and the card reader terminal, such as point of sale terminals (POS), automated teller machines (ATM), and public transport terminals. The most common form of proximity m-payment is conducted through wallet apps that store the payment information in a secure software or hardware element embedded in the mobile device (de Reuver and Ondrus, 2017). Wallet apps use a short range near field communication (NFC) protocol to transmit payment information wirelessly by waving the mobile device over the card reader terminal (Tan, *et al.*, 2014). Although both payment types mostly rely on using the same payment information, i.e. card information, remote m-payment is regarded as the earliest form of m-payment that represents an integral part of mobile commerce applications (Kreyer, *et al.*, 2002; Slade, Williams and Dwivedi, 2013). In contrast, proximity m-payment is considered as an emerging alternative that competes with existing widely used payment instruments, mainly including cards and cash (Slade, Williams, *et al.*, 2015). Such instruments have not only gained the consumer's trust over time, but also introduced new, convenient ways to conduct payments, as in the case of contactless cards. This implies that the success or failure of proximity m-payment is heavily reliant on consumers' willingness to change

their old payment habits through realising an added value from using m-payment as an alternative. This thesis focuses on understanding the impact of augmenting proximity m-payment with value-added services as a form of added value on consumers' behavioural intentions towards m-payment. The remainder of this chapter is organised as follows. Section 1.2 discusses the prospects of m-payment in terms of the benefits that it offers to consumers and businesses. The research problem is then presented in section 1.3, followed by the research aim and objectives in section 1.4. The research methodology that will be employed to achieve the research aim and objectives will be discussed in section 1.5. Section 1.6 presents the expected contributions of this study to m-payment adoption research. The structure of this thesis will be outlined in section 1.7.

1.2 Advantages of Mobile Payment

The emergence of m-payment as a new payment instrument has redefined the payments landscape with additional features and benefits for consumers and businesses. This has been largely attributed to the convenience brought by the ubiquity of the mobile phone that allows consumers to access m-payment services anytime and anywhere (Zhou, 2013; Park, *et al.*, 2019). Furthermore, the integration of NFC has served as a key enabling technology that allowed all major wallet apps to seamlessly run on the rails of existing financial industry standards that use the same technology for contactless plastic cards (Ondrus, 2015). In effect, all card reader terminals that accept contactless card payments are naturally ready to accept m-payment, thereby enabling retailers and service providers to expand their range of payment acceptance methods at no additional cost. This is particularly the case in the UK, where retailers and service providers have been increasingly upgrading their card reader terminals to accept contactless payments since the introduction of contactless card technology in 2007 (Jones, 2016). As compared to the conventional chip and pin method, contactless payment offers a faster transaction experience, which encouraged retailers and service providers to upgrade their terminals to increase productivity through reducing transaction time. According to the trade association for the UK banking and financial services sector (UK Finance), all payment terminals issued by banks in the UK are supposed to be capable of accepting contactless payments since January 2020 (UK Finance, 2019). This market readiness has not only attracted the major global mobile handset manufacturers to launch their wallet apps (Apple Pay, Google Pay, Samsung Pay) in the UK marketplace, but also encouraged some banks to develop their own contactless m-payment solutions, as in the case of Barclays Contactless Mobile.

Along with their convenience and availability as a widely accepted payment method, wallet apps have the potential to offer extra functionalities that are not available with existing payment methods. This can be achieved by taking advantage of the computing, display, and communication resources inherent in mobile devices (Madureira, 2017). For instance, wallet apps could potentially replace conventional wallets by allowing consumers to store multiple payment and loyalty cards in one place (Shin, 2009; de Kerviler, Demoulin and Zidda, 2016). This gives consumers a single point of access

to their various payment options and could encourage them to increase their use of loyalty schemes, consequently benefiting the retailers that offer these schemes. In terms of security, a report by the UK payment system regulator (Payment Systems Regulator, 2018) suggests that wallet apps offer two additional key security features that are not currently commercially available in conventional payment methods, namely biometric authentication and tokenisation. According to a BBC (British Broadcasting Corporation) News article, the first debit biometric plastic card was piloted in the UK by the Royal Bank of Scotland in April 2019, however, it was not yet clear when the technology will be available to the public (BBC News, 2019). Biometric authentication is a form of identification that allows wallet apps to verify the identity of the phone user through fingerprints or face recognition before communicating the payment details to the card reader via NFC. This security feature prevents unauthorised access to the m-payment service when a phone was lost or stolen. Tokenisation is a process that involves using a randomly generated substitute card number called 'token' that subsequently replaces the actual card number in payment transactions. The token is generated when the user stores the card details and is only valid for use through the wallet app. The main advantage of tokenisation is to prevent sharing of the original payment details with the card reader terminals, thus reducing the impact of data breaches and potential fraud (Ortiz-Yepes, 2014; Liu, Kauffman and Ma, 2015).

The advantages discussed above clearly suggest that the adoption of m-payment as an emerging payment instrument is likely to change the way consumers conduct payments. However, given the dominance of conventional payment methods, achieving the full potential of m-payment would depend on consumers' perceptions of such advantages. More specifically, the extent to which consumers perceive an added value from using m-payment as compared to conventional payment methods is a critical factor in achieving successful mass adoption. Furthermore, understanding what constitutes an added value from a consumer's perspective in the m-payment context would be useful for developing m-payment solutions that meet consumers' needs and expectations, and consequently promote adoption.

1.3 Research Problem

Despite the pronounced advantages, findings from academic and market research studies have consistently indicated that the uptake of m-payment among consumers is far below earlier projections. The adoption rate gap between mobile phones and their m-payment applications among consumers was reported by studies dating back more than a decade (Mallat, 2007; Chen, 2008), but the same phenomenon has been identified in more recent studies (Johnson, *et al.*, 2018; Zhao, Anong and Zhang, 2019). Consumer adoption of m-payment in the UK does not seem to be an exception. According to the UK's telecommunications regulator (Ofcom), 78% of the UK adult population are smartphone users (Ofcom, 2018). However, a recent market research report suggests that mass adoption of m-payment in the UK is unlikely to be realised in the foreseeable future given the slow

growth rate projected to reach only 25.5% of smartphone users by 2023 (eMarketer, 2019). Current use patterns indicate that only 16% of the UK adult population had registered for m-payment apps, with less than half of these registered users (46%) considered to be frequent users (UK Finance, 2019). This is despite the fact that the main m-payment wallet apps (Apple Pay, Google Pay, Samsung Pay) provided by the dominant global mobile handset manufacturers were commercially introduced within the past five years in the UK (Payment Systems Regulator, 2018). Therefore, a further understanding of the factors affecting consumers' decisions to take advantage of this market variety is necessary.

Research studies focusing on m-payment adoption in the UK have found that consumer perceptions of the risk and trust involved in the use of m-payment act as a strong barrier to adoption (Slade, Williams, *et al.*, 2015; Hampshire, 2017). On the other hand, it has been repeatedly argued that consumers' reluctance to change their old payment habits is due to seeing little added value from using m-payment as compared to traditional payment methods (Hayashi, 2012; Pham and Ho, 2015; de Kerviler, *et al.*, 2016). This appears to be particularly relevant to the case of the UK, where the increasing popularity of contactless cards has arguably made m-payment a less valued alternative among consumers (Titcomb, 2017). Indeed, consumers have already become accustomed to the convenience brought about by contactless card payment, suggesting that convenience is no longer an appealing value proposition for adopting the emergent m-payment. Given this strong competition, m-payment solutions should offer visible benefits over existing payment methods to gain traction among consumers (Apanasevic, 2013). Recommendations from previous research suggest that augmenting m-payment with value-added services, such as account balance inquiry, loyalty card integration, and cashback payments, may add value and promote demand (Hayashi, 2012; de Reuver, *et al.*, 2015; Apanasevic, Markendahl and Arvidsson, 2016; Madureira, 2017). Although these recommendations offer valuable insights into the potential of m-payment value-added services, there is a lack of empirical evidence supporting their presumed prospects as an added value to m-payment. More importantly, the impact that value-added services have on the consumer's perceptions of the determinants of value, and consequently the eventual behavioural intention, has not been explored in previous m-payment research. The discussion presented above has provided the motivation for undertaking the research on the effect of value-added services on consumer intention to use m-payment in the UK.

1.4 Research Aim and Objectives

The main aim of this study is *to investigate the effect of value-added services on the intention to adopt m-payment among consumers in the UK*. The following objectives have been set to achieve this aim:

1. Developing a conceptual research model that incorporates value-added services to examine their effect on the behavioural intention to adopt m-payment. The model aims to provide a means to assess the effect of value-added services as a form of added value in the presence of other influential factors that predict m-payment adoption intention. This will be achieved by reviewing the literature for relevant theories and models that focus on consumer adoption of technology and select an appropriate theoretical foundation to develop the research hypotheses. Based on suggestions from the literature as well as relevance to the UK market, a number of value-added services will be used as exemplars to evaluate the proposed model.
2. Enhancing the conceptual model and formulating the measurement items for the selected factors in the context of m-payment adoption. This will be achieved by first analysing qualitative data collected through in-depth interviews from current adopters and nonadopters of m-payment in the UK. Eliciting views from both groups aims to unveil potential differences in terms of m-payment adoption motivations and inhibitors based on the proposed model. In addition, the suggested exemplars of value-added services will be used to understand how added value is perceived within each group. The inferences drawn from the qualitative data analysis will then be used to refine the proposed model and develop appropriate measurement items from existing literature.
3. Undertaking an empirical quantitative analysis of the proposed research model. This will be achieved by first collecting an online survey experiment data from current adopters and nonadopters of m-payment in the UK. For this purpose, an experimental manipulation will be designed to examine the causal effect of value-added services on m-payment adoption intention based on the proposed model. To test the research hypotheses, the proposed model will then be analysed against the collected data to test the reliability and validity of the measurement items and to examine the relationships among the factors.
4. Providing theoretical and practical implications along with recommendations for future research. This will be based upon the findings of the study to advance knowledge about consumers' perceptions of m-payment added value and highlight potential avenues for promoting adoption of m-payment through value-added services.

1.5 Research Methodology

This section provides a brief overview of the research methodology employed by this study. Further details will be provided in Chapter 4. A mixed methods research approach involving the collection and analysis of qualitative and quantitative data was chosen for this study. Information systems researchers suggest that a mixed methods approach should be employed when the research intends to "provide a holistic understanding of a phenomenon for which extant research is fragmented, inconclusive, and equivocal" (Venkatesh, Brown and Bala, 2013). This is particularly relevant to the aim of this study since previous research has not thoroughly examined how value-added services

would add value to m-payment and affect the behavioural adoption intention. Although mixed methods research can be designed in different ways, mainly based on the timing (parallel or sequential) and order of the quantitative and qualitative methods (Creswell, 2014), an exploratory sequential mixed methods design was chosen for this study since it best aligns with the research objectives. Exploratory sequential mixed methods design starts with a qualitative phase followed by a quantitative phase (Creswell, 2014).

The qualitative phase was preceded by an extensive literature review to develop the proposed conceptual model and the research hypotheses. Semi-structured interviews, guided by the conceptual model, were used to collect qualitative data from current and prospective m-payment adopters in the UK. The interviews aimed to gain a deep understanding of the factors underpinning the proposed model and facilitate the emergence of new factors based on the rich narratives. The findings that result from this phase provide the foundations needed to refine the proposed model and inform the selection of the questionnaire measurement items for the next phase. An online survey experiment design was used to collect quantitative data in the second phase. Survey experiments allow researchers to isolate the effect of a predictor variable on one or more outcome variables. This is accomplished by manipulating the predictor variable and controlling for all other factors that might influence the outcome variable through random assignment of respondents to multiple groups (Creswell, 2014). In this study, value-added service is the predictor variable whereas the main outcome variable is the intention to use m-payment. Conducting the survey experiment aimed to provide a breadth of data to test the hypotheses underpinning the proposed model and cross-validate the quantitative and qualitative findings.

1.6 Main Research Contributions

This study makes several noteworthy theoretical contributions and practical implications to m-payment adoption research. The main contributions are briefly outlined as follows. The research:

- Develops a novel conceptual model that captures the relationship between value-added services and the determinants of value in relation to m-payment adoption by consumers. This is a particularly important theoretical contribution given the scarcity of research on the impact of value-added services on m-payment adoption.
- Contributes to theory development by demonstrating the relevance of employing a mixed methods research design to provide a holistic understanding of the different factors that affect and comprise value in the m-payment context.
- Provides empirical evidence illustrating the dynamics of adding value among consumers through experimental investigation, thus making another theoretical contribution to m-payment adoption research.

- Highlights potential avenues for adding value by offering practical guidelines that should help m-payment providers to develop consumer-centric strategies to promote m-payment adoption through enhancing m-payment value perceptions.

1.7 Thesis Outline

The remainder of this thesis is organised into six chapters as follows. Chapter 2 explores existing literature by focusing on the theoretical models and factors used to examine m-payment adoption. It also provides an overview about the findings of previous studies pertaining to the factors that influence consumers' behavioural intention towards m-payment. The chapter then proceeds by identifying gaps in existing research and provides a justification for the chosen theoretical foundation used to develop the conceptual model in Chapter 3.

Chapter 3 draws on the theoretical foundation to propose a conceptual model for this research. The chapter begins by explaining and justifying the selection of factors that comprise the proposed model. This also involves the development of the research hypotheses that define the relationships among the factors of the proposed model. Taken together, Chapter 2 and Chapter 3 fulfil the first research objective.

Chapter 4 provides a detailed discussion of the research methodology. This involves clarifying the research philosophical stance and the rationale underlying the choice of research methodology. The chapter then proceeds with an explanation of the steps involved in the research process. The chapter concludes with an outline of the research ethics considered in this research.

Chapter 5 presents the findings of the qualitative phase. It begins by analysing data obtained from the semi-structured interviews conducted in the UK to understand the effect of value-added services on m-payment adoption among consumers. It then proceeds by discussing the themes that emerged from data analysis related to each factor in the model. The chapter then provides an evaluation of the research model based on the qualitative results and discusses the model revision accordingly. Finally, the chapter illustrates the selection of previously validated measurement items from the literature based upon the findings. Chapter 5 fulfils the second research objective.

Chapter 6 reports the findings of the quantitative phase. It does so by first presenting the descriptive statistics of the sample followed by the results of a two-step analysis of the survey data collected from UK respondents. The first step reports the results of measurement model analysis. The second step involves the results of structural model analysis and hypotheses testing. The chapter concludes with a discussion that cross-validates the quantitative and qualitative findings and relates them to previous research. Chapter 6 fulfils the third research objective.

Chapter 7 summarises the key research findings and their theoretical and practical implications. The chapter concludes with an outline of the research limitations and provides suggestions for future research directions in the area of m-payment adoption. Chapter 7 fulfils the fourth research objective.

Chapter 2 Literature Review

2.1 Overview

Interest in mobile payment (m-payment) research started soon after the first payment transaction was conducted in Finland in 1997 using a mobile device with the SMS (Short Messaging Service) (Dahlberg, Guo and Ondrus, 2015). At that time, m-payment came as a result of joint efforts between mobile network operators (MNOs) and handset manufacturers who realised the potential role of the mobile phone in aspects of daily life (Ondrus, 2015). Consequently, early research contributions were mostly focused on studying issues related to m-payment as a system dominated by MNOs, who were responsible for the identification and billing of their users, namely consumers and merchants (Heijden, 2002; Dahlberg, Mallat and Öörni, 2003). The evolution from e-commerce to m-commerce retail channels has introduced the need for new m-payment solutions that provide the ubiquity, simplicity and security to conduct transactions not only remotely over MNOs' services or the Internet, but also in proximity to the payment terminal (Ondrus and Pigneur, 2006; Chen, 2008). In particular, proximity m-payment was seen as a game changer that integrated the convenience of contactless smartcards into mobile phones to digitalise cash-based transactions (Ondrus, 2015). Early initiatives of proximity m-payment solutions that emerged in Asian countries, such as Japan, South Korea, and Hong Kong, have largely contributed to this view (Ondrus and Pigneur, 2009). Although some of these initiatives were successful domestically, none of them turned into a dominant standard as they were proprietary solutions of MNOs based on RFID (Radio-Frequency Identification) technology (de Reuver and Ondrus, 2017). With the mounting interest of the major electronics and mobile handset manufacturers in proximity m-payment, the NFC (Near Field Communication) Forum was founded by Nokia, Sony and Philips in 2004 (Ozcan and Santos, 2014). The main aim of the forum was to promote the implementation and standardisation of NFC as an interoperable communication protocol for touch-based consumer interactions, which include proximity payments (NFC Forum, 2004). Following its launch, the forum was joined by the global card schemes, MasterCard and Visa, along with other tech giants such as Samsung, Microsoft and Motorola (NFC Forum, 2005). As a result, all major mobile handset manufacturers currently support NFC payment, which is also compatible with the EMV (Europay, MasterCard, and Visa) global standard used by the financial institutions to issue contactless payment cards (de Reuver and Ondrus, 2017).

Considering the above historical advances, a significant body of research has emerged over the years to increase understanding of m-payment in different countries and contexts. Researchers have identified three dominant research streams: m-payment technology, m-payment strategy and ecosystems, and m-payment consumer adoption (Dahlberg, *et al.*, 2015). This chapter begins by discussing contributions from each of these streams in sections 2.2 to 2.4. Since this research focuses on m-payment consumer adoption, a review of the main theories employed by previous research to

investigate technology adoption will be presented in sections 2.5 to 2.7. Section 2.8 examines how researchers employed the perceived value theory in technology adoption research and justifies its appropriateness to achieve the aim of this research. A review of the different conceptualisations of perceived value along with their applications in technology adoption research will be provided in section 2.9. Section 2.10 discusses the relationship between value-added services and perceived value through the concept of added value. Section 2.11 provides a detailed review of the limited research undertaken to examine the effect of value-added services on m-payment adoption. Finally, the chapter concludes with an outline of the identified research gaps in section 2.12 and a summary of the chapter in section 2.13.

2.2 Mobile Payment Technology

Research in this stream has covered a range of topics, which includes comparing the different technological implementations of m-payment solutions, identifying security issues, and proposing new m-payment solutions and security enhancements based on emerging technologies. For example, Massoth and Bingel (2009) compared four traditional m-payment implementations, namely Interactive Voice Response (IVR), SMS, Wireless Application Protocol (WAP), and One-Time Password generator (OTP), against NFC in terms of end-to-end performance. Their findings indicated that the NFC-based implementation outperforms all other technologies in terms of speed, security and usability. Furthermore, the authors anticipated that m-payment applications that employ NFC would play a major role in future m-payment solutions. Other researchers have focused exclusively on discussing the different technologies used to implement NFC m-payment solutions (e.g. Zou *et al.*, 2010; Ortiz-Yepes, 2016). For instance, Ortiz-Yepes (2016) provided a detailed review of the card emulation approaches that enable the provision of NFC payment in today's mobile devices. Card emulation is a process that allows a mobile device equipped with an NFC interface to act like a contactless payment card at point of sale (POS) terminals that support NFC. Such process involves storing cryptographic keys used in operations meant to authenticate and secure the payment credentials. The interaction between the mobile device and POS terminal takes the form of an exchange of a sequence of commands that are typically based on the EMV specifications. The commands are received via an NFC antenna integrated into the mobile device along with an NFC controller that decodes the commands and forwards them to the card emulator. Card emulation can be classified into two main approaches:

- **Secure Element (SE)** card emulation takes place in a hardware tamper-resistant component which provides a fully isolated execution environment that cannot be accessed by other mobile apps. The SE can be implemented in a dedicated chip embedded in the phone's electronic board, in the SIM (Subscriber Identity Module) card, or in a removable memory card. While the latter is less common, the embedded SE is typically controlled by handset

manufacturers whereas the SIM card SE is controlled by the MNOs (Mobile Network Operators).

- **Host Card Emulation (HCE)** is carried out in a trusted software component (host). This can be purely implemented in a mobile app that runs alongside other apps on top of the mobile device's operating system. The app employs a set of security measures to safeguard sensitive information. Alternatively, the app can delegate the processing of sensitive information to a cloud-based SE, which adds additional security measures to authenticate the mobile device to the cloud. In this case, the mobile device acts as a proxy between the POS terminal and the cloud (Roland and Langer, 2013). As a software solution, the HCE approach enables developers to create NFC m-payment apps without the complexity of deploying a hardware SE.

By comparing these approaches, Ortiz-Yepes (2016) concluded that the SE offers the best approach in terms of security as it provides a hardware-level protection, unlike the HCE approach, which employs application and operating system security mechanisms. However, the author added that security of the HCE approach could be enhanced using the cloud-based SE if proper security measures were in place at cloud level, such as hardware protection and device authentication mechanisms.

Issues related to m-payment security have attracted a significant interest among researchers. In this regard, various solutions have been proposed and/or developed in order to tackle known security risks. For instance, a study by Hassinen, Hyppönen and Trichina (2008) proposed two payment protocols that address authentication and non-repudiation issues associated with remote and proximity m-payment systems. In doing so, the authors implemented and evaluated an open public-key infrastructure solution as a proof of concept to be used by governments. Isaac and Sherali (2014) outlined the security vulnerabilities associated with the different underlying m-payment technologies and proposed the corresponding protection solutions. For example, they suggested using secure protocols and encryption techniques to protect contactless communication between the mobile device and the POS against traffic interception threat. Furthermore, the authors have highlighted the security threats related to emerging technologies such as cloud-based proximity m-payment solutions that enable the storage of payment credentials in the cloud instead of the mobile device. In this regard, Pourghomi, Saeed and Ghinea (2014) proposed a secure cloud-based NFC m-payment protocol, enhanced with an additional security layer to authenticate the customer through the MNO. According to the design, the authors assumed that the MNO has full control over the SE as part of the SIM card, which is used in the authentication process. The payment credentials are stored in a cloud managed by the MNO, which acts as a trusted intermediary between the customer and merchant to guarantee the payment. In a similar vein, other studies have proposed enhancements to tackle security issues associated with the EMV global standard used today by financial institutions to secure NFC

payments. In this regard, researchers have discussed two vulnerabilities: (1) lack of mutual authentication between the point of sale (POS) terminal and the customer's payment device; and (2) insecure transmission of payment information to the POS. To solve these issues, researchers have proposed an additional security layer through introducing a trusted authentication server that provides the security functions to authenticate the participating parties and protect their communications (Madhoun and Pujolle, 2016; Al-Haj and Al-Tameemi, 2018).

2.3 Mobile Payment Strategy and Ecosystem

Research in the area of m-payment strategy and ecosystems has mainly focused on highlighting the roles of stakeholders involved in the m-payment market, analysing m-payment business models, and understanding strategies applied in m-payment initiatives. The term 'ecosystem' has been used in m-payment research as an umbrella term that encompasses m-payment market and providers (Dahlberg, *et al.*, 2015). For instance, Au and Kauffman (2008) employed economic theories to propose a framework that identifies the relevant stakeholders involved in m-payment as a disruptive technology in the domain of electronic payment technology systems. The aim was to analyse issues related to consumer, firm, business process, market, industrial and social aspects. Ozcan and Santos (2014) demonstrated how global firms from different industries, including MNOs, banks, hardware manufacturers, and merchants, struggled to collaborate and agree on the architecture of the m-payment market. The authors concluded that firms from different industries lack experience in inter-industry collaboration due to their dominance in their respective industries. Such dominance has resulted in disagreements over issues, such as the ownership of the customer and the control of the security of transactions. Hedman and Henningsson (2015) proposed an m-payment cooperation framework to highlight the impact of payment digitalisation on the competition and collaboration among traditional and new stakeholders in the payment ecosystem. The authors validated their framework using three cases of m-payment innovation in Denmark. They illustrated how technology can be employed by existing stakeholders in defensive strategies to protect their market position, whereas newcomers can use it in their offensive strategies to gain entry to the ecosystem. A retrospective analysis of m-payment evolution between 1997 and 2014 was followed by Liu, Kauffman and Ma (2015) to investigate how competition, cooperation, and regulation had shaped m-payment technology innovation . The authors highlighted that collaboration among central banks, commercial banks, and m-payment providers is crucial for the success of new m-payment business models.

Gannamaneni, Ondrus and Lyytinen (2015) explored the factors that led to the failure of m-payment as a multisided platform that brings together two types of users: consumers (payers) and merchants (payees). By analysing cases of m-payment platforms from different countries, the authors conducted a three-level analysis: sponsor level, platform level, and user level. The sponsor level includes the roles and interrelationships among platform stakeholders, such as MNOs and financial institutions.

The platform level is concerned with the technological, standardisation, and economic issues of the platform. The user level pertains to the value gained by the consumers and merchants who join the platform. The authors concluded that lack of collaboration among sponsors, absence of a standard technology, and failure to provide users with key value-added features over existing payment methods were the main factors that hindered the success of the studied cases. Using the same three levels of analysis, de Reuver and Ondrus (2017) elicited the advantages and disadvantages that stakeholders consider based on the different technological architectures of the SE. The authors delineated three mainstream architectures of the SE: SIM-centric, device-centric, and host card emulation (HCE). The authors concluded that the advantages that a particular architecture offers on the technology level in terms of security and performance are not enough to win the market. They suggested that other issues, such as trust and dominance at the provider level along with factors related to adoption at user level, should be considered.

The presence of a viable business model has been regarded as one of the essential factors for the growth of m-payment services (Iman, 2018). Against this assumption, some researchers have studied m-payment ecosystems from a business model perspective to understand the issues that impede their acceptance. Chae and Hedman (2015) proposed a business model for m-payment that comprises five dimensions: the value proposition to customers and merchants, the m-payment industry stakeholders, the technological resources, the financial aspects related to economic viability, and the external threats arising from competition and changes in technology and regulations. The authors validated their model using two case studies of NFC m-payment services. Similarly, Jocevski, Ghezzi and Arvidsson (2020) proposed an m-payment platform business model based on four pillars: the value proposition of the core payment service and value-added services; infrastructure management involving key partners, key activities, and key resources; customer interface relating to customer segments and various mediums of interaction; and the financial perspective that pertains to costs and revenues. The authors based their conceptual representation of the model on considering m-payment as a two-sided platform of interdependent customer segments, namely consumers and retailers. However, their focus was on applying the business model on two cases of m-payment platforms to examine the strategies that essentially aimed at attracting retailers to join the platform. Collectively, research contributions in this stream have provided a holistic understanding about the main players in the m-payment ecosystem and highlighted the main issues that pertain to the success or failure of m-payment initiatives.

2.4 Mobile Payment Adoption

M-payment adoption research is concerned with highlighting the factors related to consumer preferences and barriers to using m-payment as a technology-based service. Understanding such factors is important for decision makers to create viable services by harnessing technology to generate value to consumers as well as other stakeholders in the m-payment ecosystem (Dahlberg,

et al., 2015). Research on acceptance and use of new technologies among individuals has been regarded as one of the most mature information systems research streams (Venkatesh, Davis and Morris, 2007). Researchers in this stream have employed theories from different disciplines, such as information systems, social psychology, economics, and marketing. The goals were to develop and validate models in order to predict adoption of new information technology systems and services (Venkatesh, *et al.*, 2003; Kim, Chan and Gupta, 2007). In most cases, these models comprised different factors as independent variables to predict behavioural intention as the key dependent variable. The role of intention as a critical predictor of actual behaviours (e.g., usage) has been well-established in information systems and other disciplines (Ajzen, 1991; Venkatesh, *et al.*, 2003).

As an emerging technology-based payment service that has not received the anticipated acceptance among consumers (Zhou, 2014; Johnson, *et al.*, 2018), researchers have found m-payment an interesting focus of research to explore potential factors affecting its adoption. The importance of m-payment as an innovative payment instrument is another motive that has encouraged m-payment adoption research. Authors have argued that m-payment creates competitive advantages to businesses and service providers (Mallat, 2007), which include offering a distinctive value to consumers and merchants (Lai and Chuah, 2010); combining the utility of card payments with the enjoyment of using mobile phones (Cocosila and Trabelsi, 2016); and having a significant potential for growth in future due to the vast reliance on mobile phones as ubiquitous devices (Kim, Mirusmonov and Lee, 2010). Despite the increasing number of studies, some researchers have considered that m-payment adoption research is still in its infancy (Slade, Williams and Dwivdei, 2013) and is a relatively new area of research as compared to other related areas, such as Internet and mobile banking and Internet and mobile commerce (Oliveira, *et al.*, 2016). In a systematic review of m-payment adoption literature between the years 2007-2014, Dahlberg, *et al.* (2015) have shown that most studies have relied upon well-established information systems theories that mainly include the technology acceptance model (TAM), the diffusion of innovations theory (DOI) (Rogers, 1995), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, *et al.*, 2003). A more recent systematic review of existing m-payment adoption research up to 2018 indicates that these theories, in addition to UTAUT2 (Venkatesh, Thong and Xu, 2012), still represent the dominant theoretical basis of m-payment adoption studies (Harris, Chin and Beasley, 2019). Most researchers have approached their investigation by extending one technology adoption model with constructs from other models to adapt their theoretical foundation to the context of m-payment. A brief background about these theories along with examples of their application in m-payment adoption research is provided in the following sections.

2.5 Technology Acceptance Model (TAM)

The technology acceptance model (TAM) was developed by Davis (1989) as an adaptation of Fishbein and Ajzen's (1975) theory of reasoned action (TRA), which has well established roots in

social psychology research. TAM suggests that an end-user's acceptance of a computer-based system is determined by two constructs: perceived usefulness and perceived ease of use (Davis, Bagozzi and Warshaw, 1989). Perceived usefulness is the degree to which users believe that the system will increase their job performance in an organisational context, whereas perceived ease of use is the belief that using the system is free of effort. The model posits that these two factors determine the user's attitude towards the intention to accept the given system – which leads to the actual use behaviour. TAM has been extensively used in technology adoption studies (Chandra, *et al.*, 2010). It was also the most used model in m-commerce, m-banking, and m-payment adoption research (Slade, Williams and Dwivedi, 2014). In particular, many studies have employed TAM's constructs (perceived usefulness and/or perceived ease of use) to predict behavioural intentions toward m-payment (Chen, 2008; Chandra, *et al.*, 2010; Kim, *et al.*, 2010; Schierz, Schilke and Wirtz, 2010; Tan, *et al.*, 2014; Koenig-Lewis, *et al.*, 2015; Pham and Ho, 2015; Ooi and Tan, 2016; Bailey, *et al.*, 2017; Liébana-Cabanillas, de Luna and Montoro-Ríosa, 2017; Su, Wang and Yan, 2018).

However, applying TAM outside organisational research contexts may result in several limitations. First, TAM is too parsimonious and lacks the ability to account for the social and emotional aspects of technology acceptance (Bagozzi, 2007; López-Nicolás, Molina-Castillo and Bouwman, 2008). Second, TAM ignores any costs, monetary and nonmonetary, associated with technology acceptance and use, such as those normally incurred by consumers outside work-related context (Nysveen, Pedersen and Thorbjørnsen, 2005). Finally, the model's predictive power to explain various forms of technology is limited due to its parsimony, suggesting the need for integrating additional theoretical concepts to account for the contextual variations of accepting different technologies (Nysveen, *et al.*, 2005). These limitations explain the reason why most of m-payment adoption studies have extended the original TAM with constructs from other relevant research or theories. These constructs were chosen based on their expected impact on m-payment adoption, such as subjective norms and perceived security (Liébana-Cabanillas, *et al.*, 2017); perceived trust and perceived risk (Hampshire, 2017); self-efficacy and personal innovativeness (Shankar and Datta, 2018); compatibility (Chen, 2008; Su, *et al.*, 2018); convenience (Kim, *et al.*, 2010); and perceived cost (Tan, *et al.*, 2014; Phonthanukitithaworn, Sellitto and Fong, 2016). Therefore, it could be suggested that the successful application of TAM might be attributed to the extensions that the authors made to the original model to adapt it to the m-payment context.

2.6 Diffusion of Innovations Theory (DOI)

The diffusion of innovations theory (DOI) postulates that the rate at which individuals adopt a new innovation can be explained by five attributes, namely relative advantage, compatibility, complexity, observability, and trialability (Rogers, 1995). DOI theory has been characterised as one of the most influential theories in predicting innovation adoption (Chen, 2008) as a means to highlight the impact of technology characteristics on adoption of different technologies (Pham and Ho, 2015). Although

DOI has been less commonly used than TAM in m-payment adoption research (Slade, *et al.*, 2014), several studies have extended other theories with constructs from DOI (Chen, 2008; Kim, *et al.*, 2010; Li, Liu and Heikkilä, 2014; Oliveira, *et al.*, 2016). On the other hand, some studies have employed DOI as a core theory complemented with constructs from other models such as TAM (Arvidsson, 2014; Pham and Ho, 2015; Johnson, *et al.*, 2018). For instance, in an early exploratory study that applied DOI as a core theory, Mallat (2007) argued that DOI is more appropriate than TAM in studying m-payment as a service adopted by consumers, not employees in an organisational context. However, a follow-up confirmatory study of Mallat's work by Arvidsson (2014) suggests that TAM and DOI are not enough to fully understand the critical factors for the success of m-payment as a consumer service. To tackle this issue, the author recommends that theories focusing on service management and value-creation should be employed to provide a better understanding on such factors.

2.7 Unified Theory of Acceptance and Use of Technology (UTAUT and UTAUT2)

Venkatesh, *et al.* (2003) have developed and validated the unified theory of acceptance and use of technology (UTAUT) by integrating previous prominent technology acceptance theories, such as TRA, TAM and DOI into one model. The aim was to provide a unified theory that eliminates the need for choosing from a multitude of theories or employing factors from different theories. Similar to TAM, UTAUT seeks to examine acceptance of technologies in an organisational context. It suggests that behavioural intention is predicted by three constructs, namely performance expectancy, effort expectancy, and social influence. The actual use behaviour is determined by behavioural intention and facilitating conditions. The theory further posits that gender, age, experience and voluntariness of use moderate the relationships towards behavioural intention and use behaviour. As a theory synthesised from other major theories, Thakur (2013) has employed UTAUT without any extensions to examine m-payment adoption. On the other hand, since UTAUT was developed with the intent of providing a generalised model, researchers suggested that its core constructs should be reconceptualised or additional factors need to be integrated to adapt it to different research contexts (Yu, *et al.*, 2017). For this reason, the literature shows that several m-payment adoption researchers have extended UTAUT with factors from earlier studies, such as perceived transaction convenience and perceived transaction speed (Teo, *et al.*, 2015); perceived risk and perceived cost (de Sena Abrahão, Moriguchi and Andrade, 2016); hedonic performance expectancy, utilitarian performance expectancy, and self-efficacy (Khalilzadeh, Ozturk and Bilgihan, 2017).

Recognising that UTAUT was originally developed to examine technology acceptance and use among employees within organisations, Venkatesh, Thong and Xu (2012) have developed UTAUT2 as an extension of UTAUT tailored specifically for consumer acceptance and use of technologies and services. For this purpose, the new theory has extended UTAUT with three additional constructs that predict behavioural intention, namely hedonic motivation, price value, and habit. As a consumer-

focused technology acceptance theory, researchers have taken advantage of UTAUT2 as a suitable theoretical lens to examine m-payment adoption as a consumer service. Slade, Williams, *et al.* (2015) have extended UTAUT2 with perceived risk and trust in provider from previous studies to represent the perceived uncertainty of using new technological services involving financial transactions. Another study by Oliveira *et al.* (2016) has complemented UTAUT2 with compatibility and innovativeness from DOI theory along with perceived technology security from earlier studies. However, Oliveira *et al.* (2016) have excluded the habit factor since m-payment was not popular enough among consumers to form a habit. It is worth noting that both studies have found no support for some of the original constructs of UTAUT2 towards predicting behavioural intention, namely effort expectancy, facilitating conditions, hedonic motivation, and price value. In particular, Oliveira *et al.* (2016) have concluded that the new constructs that distinguish UTAUT2 as a consumer-focused theory, namely hedonic motivation and price value, may be irrelevant to m-payment adoption. This conclusion has also been supported by Limantara, Jingga and Surja (2018), where no significant effect of hedonic motivation and price value on m-payment adoption intention was found. Other studies have excluded the price value factor by highlighting that NFC m-payment does not involve any extra financial cost on the consumer side (Koenig-Lewis, *et al.*, 2015; Morosan and DeFranco, 2016; Kanishk and Arora, 2019; Moorthy, *et al.*, 2019). Furthermore, it has been argued that the construct of price value focuses only on the financial side of cost while ignoring other potential nonmonetary costs, such as the perceived risk associated with using services that involve sharing of financial information (Shaw and Sergueeva, 2019). To compensate for this shortcoming, price value has been replaced with perceived value to account for costs and benefits relevant to the context of such services, such as m-banking (Farah, Hasni and Abbas, 2018) and m-commerce (Shaw and Sergueeva, 2019) services. Perceived value will be discussed in detail in section 2.9. Although UTAUT2 seems to be appropriate to examine technology adoption in a consumer context, evidence from previous studies discussed above indicates that its consumer-related factors may not be well-suited to the m-payment context. More importantly, the theory has already been applied by Slade, Williams, *et al.* (2015) to study m-payment adoption in the UK. Thus, one of the objectives of this study is to develop a novel model based on a different theoretical approach that aims to provide new insights to extend previous findings.

2.8 Value-Based Approach in Technology Adoption Research

The theories discussed in the previous sections have been instrumental in producing useful contributions to m-payment and technology adoption research in general by highlighting the impact of various factors on behavioural intentions. However, applications of such theories in a consumer context were criticised for overlooking the role of value and its determinants as an important behavioural intention predictor (Turel, Serenko and Bontis, 2007; Ström, Vendel and Bredican, 2014; de Kerviler, *et al.*, 2016). In a consumer context, value maximisation has been regarded as the basic

assumption for examining behavioural intentions towards technology (Kim, *et al.*, 2007). On the other hand, adoption of technologies among individuals in organisational settings, which is the basic aim of traditional technology acceptance theories founded on TAM (Jung, 2014), are often based on non-voluntary decisions that seek to increase productivity in the workplace (Turel, Serenko and Bontis, 2010). More importantly, any cost associated with the adoption and use of such technologies is borne by the organisation (Kim, *et al.*, 2007). In contrast, digital technologies and services are offered to the public to use voluntarily, thus adopters in this case are service consumers rather than just technology users. Against this background, Kim, Chan and Gupta (2007) have developed the first value-based acceptance model by empirically confirming the impact of perceived value as a mediator between consumer beliefs about a technology and their intention to adopt it. Furthermore, the authors have compared the performance of their value-based model with TAM in explaining consumer intention to adopt mobile internet service. The results suggest that the value-based model has outperformed TAM by explaining 35.9% of variance in adoption intention as compared to TAM, which explained just 13.1%. These findings provide further evidence on the appropriateness of value-based models in predicting technology adoption based on consumer beliefs about the value of technology. Consumer beliefs in this context represent their perceptions of benefits and sacrifices pertaining to the technology in question. By employing the assumptions of perceived value theory, value-based acceptance models posit that consumer technology adoption decisions are subjectively evaluated on a net-value basis for what is received as a benefit against what is given as a sacrifice (Kim, Xu and Gupta, 2012; Yu, *et al.*, 2017). This evaluation becomes particularly crucial when consumers are presented with multiple options as in the case of payment methods. In such a case, Au and Kauffman (2008) argue that consumers are inclined to use a combination of payment instruments that maximise their benefit. Consequently, they choose the best option that brings the maximum utility for a given payment scenario (Ondrus, Lyytinen and Pigneur, 2009). Thus, as an emerging payment instrument, m-payment has to offer higher realised value to effectively compete with existing widely used alternatives (Au and Kauffman, 2008; Madureira, 2017).

Consumer perceived value has been confirmed as a salient determinant of behavioural intentions to adopt various technologies and services, such as mobile data services (Al-Debei and Al-Lozi, 2014), wearable devices (Yang, *et al.*, 2016), Internet shopping (Kim, *et al.*, 2012), on-demand multimedia services (Lin, *et al.*, 2012) and media tablets (Yu, *et al.*, 2017). However, it is noted that very limited research has utilised perceived value theory to examine m-payment adoption (e.g. Cocosila and Trabelsi, 2016; de Kerviler, Demoulin and Zidda, 2016) as compared to other technology acceptance models. This can be attributed to the overreliance on traditional technology acceptance models such as TAM and UTAUT. In this regard, researchers have suggested that theories from other disciplines should be used to explore other factors pertinent to the adoption of m-payment (Arvidsson, 2014; Dahlberg, *et al.*, 2015). This study responds to this call by employing the perceived value theory,

which has roots in marketing literature, as a suitable theoretical lens that fits the aim of investigation. Furthermore, since this study focuses on the possibilities of adding value to m-payment through value-added services, it becomes necessary to first understand the way consumers perceive the underpinnings of value in this context. More importantly, value-based adoption approach is deemed suitable for this study as it provides the relevant theoretical foundation to integrate the effect of value-added services. This will be discussed in more detail in section 2.10.

2.9 Perceived Value Theory and its Conceptualisations

Value is considered as a multidisciplinary concept that has roots and paradigms across different domains including social psychology, economics, marketing, and consumer behaviour research. As a result of this diversity, different terminologies have been used to define value mainly including perceived value (Zeithaml, 1988), consumer value (Sánchez-Fernández, Iniesta-Bonillo and Holbrook, 2009), consumer perceived value (Sweeney and Soutar, 2001) and consumption value (Sheth, Newman and Gross, 1991). Although the concept of perceived value has been defined by many researchers, Eggert and Ulaga (2002) have identified three common definition elements. First, perceived value is a trade-off between a combination of multiple components of benefits and sacrifices as perceived by consumers in a market offering. Second, value is recognised as a subjective construct where different consumers perceive different value dimensions in a given product. Finally, value is relatively perceived in comparison with available alternative market offerings in a specific use situation. The subjective nature of the concept of value appears to be reflected in the different approaches that researchers have followed to conceptualise it. Researchers have identified three different approaches to represent value, namely the unidimensional approach, the multidimensional approach, and the higher order approach (Sánchez-Fernández and Iniesta-Bonillo, 2007; Zauner, Koller and Hatak, 2015). These approaches are explained in the following sub-sections, which also discuss the applications of these approaches in technology adoption research.

2.9.1 The Unidimensional Approach

The unidimensional approach conceptualises value as an overall outcome of rational evaluation that aims to maximise utility and account for alternative market offerings (Zauner, *et al.*, 2015). More specifically, value is modelled as a single construct that can be measured by one or more items to reflect the cognitive evaluation of relevant benefits and sacrifices as perceived by consumers (Sánchez-Fernández and Iniesta-Bonillo, 2007). Early conceptualisations of this approach defined value as a cognitive trade-off between quality and sacrifice for the price paid (Dodds and Monroe, 1985). According to this definition, price is conceptualised to have a positive effect on both quality and sacrifice whereas value is positively affected by quality and negatively affected by sacrifice (Dodds, Monroe and Grewal, 1991). Thus, quality and sacrifice are conceptualised as antecedent constructs of value, not as its formative components (Sánchez-Fernández and Iniesta-Bonillo, 2007).

In a seminal study that adapted Dodds and Monroe's (1985) conceptualisation, Zeithaml (1988) developed a means-end model that captures the relationship between quality, price and value. By assuming that consumers are goal-oriented, means-end models are hierarchical models that link value as an 'end' with product attributes as a 'means' that consumers assess to reach that end (Gutman, 1982). Accordingly, as Gutman (1982) explains, consumers choose products for the desirable consequences they get, thus trading off any undesirable outcomes that their choice involves. Against this background, Zeithaml (1988) defined value as "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given". This broad definition of value as an 'overall assessment' has become the most widely accepted among researchers (Kim, *et al.*, 2007; Turel, *et al.*, 2007; Yang, *et al.*, 2015). Zeithaml's (1988) conceptual model (see Figure 2.1) postulates that consumers evaluate products based on their perceptions of price, quality, and value rather than the objective attributes, such as actual price and quality. However, the author emphasised that value is a high-level abstraction that differs from quality in two main aspects. First, value is more individualistic and personal, thus at a higher level than quality. Second, unlike quality, which focuses only on the get (benefit) components perceived in a product's superiority and excellence, value involves a trade-off between the get and give (sacrifice) components.

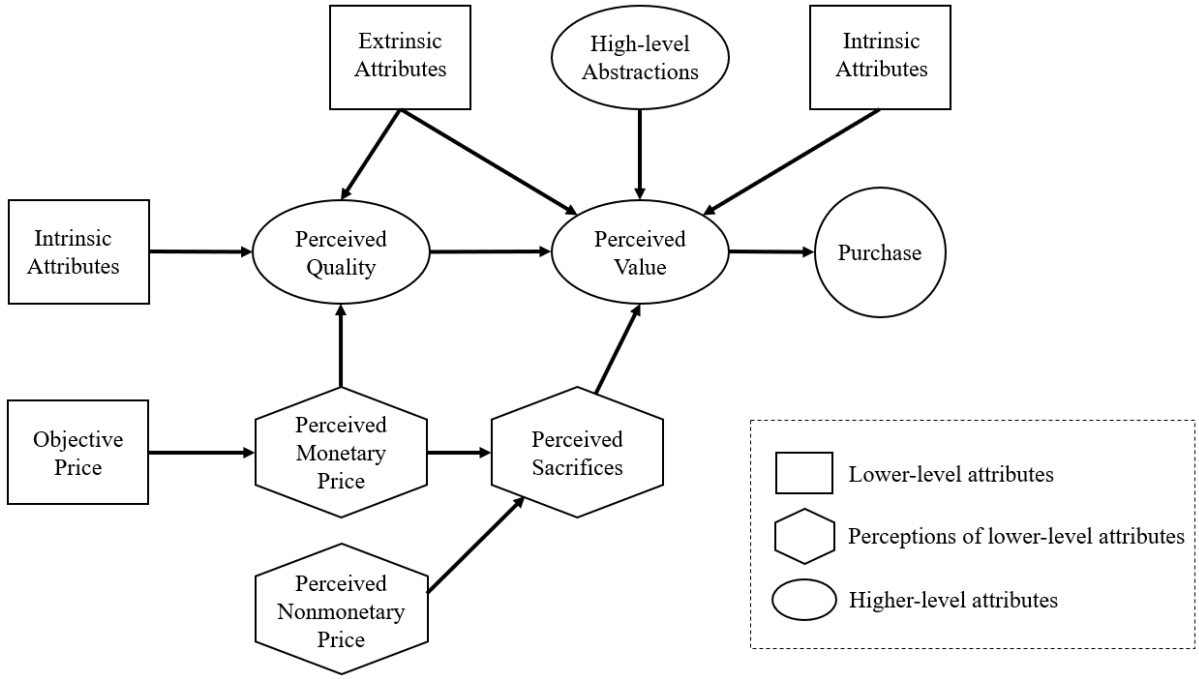

Figure 2.1 Means-End Model of Value (Zeithaml, 1988)

An important aspect of Zeithaml's (1988) model is the conceptualisation of value as a high-level abstraction. This indicates that, contrary to Dodds and Monroe (1985), value is conceptualised as a higher order overall construct inferred from its lower order constructs of perceived quality and sacrifice (Sánchez-Fernández and Iniesta-Bonillo, 2007; Zauner, *et al.*, 2015). In other words, instead of being directly measured by one or more items, value is derived from its lower order constructs.

Researchers argue that a higher order construct can be considered as multidimensional in the sense that each of its lower order constructs represents a distinct aspect (Ruiz, *et al.*, 2008).

In addition to perceived quality, the benefit components of value in this model include a product's intrinsic and extrinsic attributes as well as higher-level abstractions. Intrinsic attributes relate to the physical composition of the product, such as colour, size, etc. These attributes cannot be changed without altering the nature of the product and are consumed with the product. On the other hand, extrinsic attributes are related to the product but are not part of its physical composition, such as brand image, price, etc. At this point, Zeithaml (1988) clarifies that intrinsic attributes are not tangible when the product is a service, hence consumers rely on extrinsic attributes as signals to quality and value. Finally, the author argues that other high-level abstractions, such as convenience, prestige and appreciation, can contribute to perceptions of value. On the sacrifice side, monetary components, such as price, as well as nonmonetary components, such as time, energy, and effort, are all considered as sources of cost.

Applications of perceived value as a unidimensional concept in technology adoption research have employed different constructs to represent benefits and sacrifices relevant to the context of the technologies examined. By reviewing existing technology adoption literature, a summary has been produced in Table 2.1 to outline the investigated technologies along with the benefit and sacrifice constructs that the authors employed as antecedents to the unidimensional perceived value construct. It is to be noted that most of the 9 reviewed studies have diverged from the initial utilitarian assumption of value to include other symbolic and affective benefits such as social and enjoyment factors respectively. In this regard, researchers have argued that the benefits side of value associated with technology adoption can be defined in terms of social and intrinsic aspects in addition to extrinsic (utilitarian) motivations (Yang, *et al.*, 2016; Yu, *et al.*, 2017). These additional constructs of benefits have been introduced in the multidimensional conceptualisation of value, which will be discussed in detail in section 2.9.2. Although social, extrinsic and intrinsic motivations were highlighted as determinants of value in marketing and consumer behaviour research, information systems researchers have reinforced their importance as intention predictors in technology adoption context (Lin and Bhattacherjee, 2010; Venkatesh, *et al.*, 2012). Along with this general typology of benefits, other researchers have employed ad-hoc constructs that directly relate to the context of technologies studied. For instance, Kim, Xu and Gupta (2012) found that perceived trust in online vendors can be regarded as a benefit that positively influences perceived value of Internet shopping. The authors argued that dealing with trustworthy vendors reduces perceived risks associated with online environments and saves the time and effort that consumers need to choose a vendor. Similarly, Liu *et al.* (2015) included two facets of utilitarian benefits, namely monetary savings and convenience, in addition to enjoyment as benefits of mobile coupon applications, which facilitate consumers' use of coupons issued by merchants through mobile apps.

Table 2.1 Applications of Unidimensional Value Approach in Technology Adoption Research

Source	**Technology/Service**	**Benefits**	**Sacrifices**
Kim *et al.* (2007)	Mobile Internet	Usefulness Enjoyment	Technicality Perceived fee
Kleijnen, de Ruyter and Wetzels (2007)	Mobile services	Time convenience User control Service compatibility	Risk Cognitive effort
Wang and Wang (2010)	Mobile hotel reservation applications	Information quality System quality Service quality	Technological effort Perceived fee Perceived risk
Kim *et al.* (2012)	Internet shopping	Perceived trust	Perceived price
Liu, Zhao, *et al.* (2015)	Mobile coupon applications	Perceived money savings Perceived convenience Perceived enjoyment	Perceived fees Perceived privacy risk
Yang *et al.*(2016)	Wearable devices	Perceived usefulness Social image Perceived enjoyment	Performance risk Financial risk
Nejad *et al.* (2016)	Social media	Perceived usefulness Perceived monetary value Perceived social value	None
Yu *et al.* (2017)	Media tablets	Perceived usefulness Perceived enjoyment Social image	Perceived risk
Lin, Wang and Huang (2018)	M-payment	Mobile convenience Service compatibility	Security risk Perceived fee

In terms of sacrifices, it is noted that researchers have included nonmonetary costs, such as risk and effort, in addition to financial cost to reflect the 'give' side of value. In particular, many studies have used perceived risk as a sacrifice construct by indicating that consumer adoption decisions of a given technology involve evaluating concerns pertaining to the consequences of using such technology. For example, a salient negative effect of different facets of risk on perceived value has been confirmed in the context of mobile services (Kleijnen, *et al.*, 2007), mobile coupon applications (Liu, Zhao, *et al.*, 2015), and m-payment (Lin, *et al.*, 2018). Likewise, factors related to perceptions of

effort involved in using technologies, such as mobile services (Kleijnen, *et al.*, 2007) and mobile hotel reservation applications (Wang and Wang, 2010) were found to negatively influence consumer perceptions towards value of such technologies.

2.9.2 The Multidimensional Approach

Contrary to the overall trade-off concept, the multidimensional approach replaces the focal construct of perceived value with multiple individual constructs, which represent benefits and sacrifices as predictors of the outcome of interest. In this view, value is seen as a complex notion comprising several dimensions that form a holistic representation of the phenomenon (Sánchez-Fernández and Iniesta-Bonillo, 2007). In addition, researchers who supported this view have argued that the conceptualisation of value as a trade-off between price and functional utility is too simplistic (Sweeney and Soutar, 2001) and has particularly failed to explicitly account for emotional and intangible benefits as forms of value (Sánchez-Fernández and Iniesta-Bonillo, 2007). Consequently, new dimensions of value have been introduced to reflect the value that consumers perceive in an object or experience for its own sake not just for its utilitarian performance (Sweeney and Soutar, 2001). For example, whilst Holbrook and Hirschman (1982) suggested a pure experiential paradigm of value based on symbolic, hedonic and aesthetic aspects of the consumption, Babin, Darden and Griffin (1994) emphasised the presence of both utilitarian and hedonic aspects of value in a shopping context. Other broader and more comprehensive multidimensional conceptualisations of value were introduced in the theory of consumption values (Sheth, *et al.*, 1991) and the typology of consumer value (Holbrook, 1999).

The theory of consumption values, as illustrated in Figure 2.2, suggests that consumer choice is a function of five independent value dimensions, where contributions of these dimensions towards the choice behaviour vary based on the use situation as well as the product or service being considered. Below is a summary of each dimension according to the definitions provided by Sheth, Newman and Gross (1991):

- **Functional value** is the utilitarian benefit derived from a product or service's attributes, such as functional performance, reliability, durability and price. Functional value represents the primary driver for consumer choice.
- **Social value** is the value acquired as a result of a product or service's association with one or more social groups. More specifically, social value addresses perceptions derived from appreciation of important others with regards to the use of a given service or product.
- **Emotional value** is the value derived from the feelings and affective states associated with the use of a product or service.
- **Epistemic value** represents the value of a product or service's capacity to arouse curiosity, present novelty or satisfy a desire for knowledge. This type of value is more relevant for

entirely new experiences that consumers seek as a result of their curiosity or in pursuit of acquiring new knowledge.

- **Conditional value** pertains to the value perceived in a product or service as a result of a specific situation or set of circumstances faced by the consumers. Such value can be functional or social based on such circumstances.

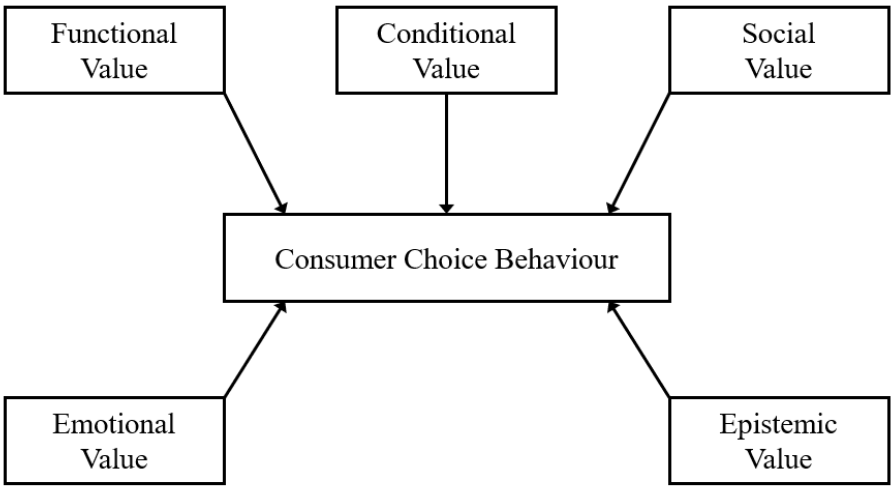

Figure 2.2 Theory of Consumption Values (Sheth, *et al.*, 1991)

According to Sweeney and Soutar (2001), the theory of consumption values provides the best foundation for extending value constructs since it was intensively validated across different disciplines, including economics and social psychology. With the aim of developing a general value measurement model applicable to diverse domains, Sweeney and Soutar (2001) employed the theory of consumption values to develop the so called perceived value 'PERVAL' scale used to measure consumers' perceptions of value. The scale was successfully validated with four value dimensions in the context of purchasing durable goods, namely functional (price/value for money), functional (performance/quality), emotional, and social. The authors omitted epistemic and conditional value dimensions due to irrelevance of epistemic value in the context of their study and because conditional value was originally conceptualised as an instance of other value types in certain situations (Sheth, *et al.*, 1991). Most notably, the dichotomy that the authors developed and validated for the functional value has distinguished between performance and economic value types representing the utilitarian nature of the original construct in terms of quality and price respectively. However, price in this context was implied as an evaluation of the value received for the money spent, which translates into a benefit.

Holbrook (1999) followed a different approach to represent value by introducing three classifications of value: extrinsic versus intrinsic, self-oriented versus other-oriented, and active versus reactive. Whilst extrinsic value resembles the utilitarian benefit linked to perceptions of functional superiority

of a given consumption experience to achieve an external goal, intrinsic value is related to hedonic and emotional states associated with such experience per se. Self-oriented and other-oriented value types relate to whether a consumption experience is valued because of its effect on the consumer or on others in his/her social circle respectively. Finally, active value refers to mental and physical activities that a consumer does to a product whereas reactive value results from appreciating or responding to actions done by the product as part of the consumption experience. By combining these three dichotomies of value, Holbrook (1999) proposed a consumer value typology that consists of eight distinct value types as shown in Table 2.2. In a subsequent study co-authored by Holbrook (Sánchez-Fernández, *et al.*, 2009), the eight value types were further grouped under four main aspects, namely economic value (efficiency and excellence), hedonic value (play and aesthetics), social value (status and esteem), and altruistic value (ethics and spirituality). Interestingly, apart from the altruistic value, the assumptions of Holbrook's consumer value typology resonate with Sheth, Newman and Gross's (1991) theory of consumption values in that they both address economic, hedonic and social value dimensions as determinants of consumer choice behaviour.

Table 2.2 Typology of Consumer Value (Holbrook, 1999)

		Extrinsic	*Intrinsic*
Self-oriented	*Active*	EFFICIENCY (Output/Input, Convenience)	PLAY (Fun)
	Reactive	EXCELLENCE (Quality)	AESTHETICS (Beauty)
Other-oriented	*Active*	STATUS (Success, Impression, Management)	ETHICS (Virtue, Justice, Morality)
	Reactive	ESTEEM (Reputation, Materialism, Possessions)	SPIRITUALITY (Faith, Ecstasy, Sacredness, Magic)

Studies that employed the multidimensional conceptualisation of value in technology-related behavioural intention research have mostly relied on the theory of consumption values (Sheth, *et al.*, 1991; Sweeney and Soutar, 2001) as a theoretical foundation. This can be attributed to the simplicity of its structure and the availability of validated operationalisations for its components. In contrast, Holbrook's (1999) consumer value typology has been characterised as difficult to operationalise due

to the complexity of its structure and the subtle differences among some of its components (Sánchez-Fernández and Iniesta-Bonillo, 2007). The literature review summarised in Table 2.3 revealed that 8 studies have applied the multidimensional approach to conceptualise perceived value as a determinant of behavioural intentions towards technology. Whilst some researchers have employed the general utilitarian/functional aspect of perceived value, others have utilised the dichotomy proposed by Sweeney and Soutar (2001) to reflect this aspect in separate quality and price components. The quality aspect was reflected in convenience or performance whereas the price aspect was conceptualised as monetary value, value for money, or economic benefit. In particular, it is noted that the price component of value has been operationalised as the benefit received for the price paid except in de Kerviler, Demoulin and Zidda 's (2016) study, where the authors have conceptualised the economic benefit of m-payment in terms of its ability to save money and reduce financial cost. In terms of social value, all researchers have included the social component of value apart from Hong, Lin and Hsieh (2017), who employed the general conceptualisation of value as a combination of utilitarian and hedonic components (Babin, *et al.*, 1994). Finally, the hedonic component of value has been included in all studies, thus suggesting the importance of such a component in the context of behavioural intentions towards technology.

Table 2.3 Applications of Multidimensional Value Approach in Technology Adoption Research

Source	**Technology/Service**	**Benefits**	**Sacrifices**
Pihlström and Brush (2008)	Information and entertainment mobile services	Monetary value Convenience value Emotional value Social value Conditional value Epistemic value	None
Yang and Jolly (2009)	Mobile data service	Functional value Emotional value Monetary value Social value	None
Wang, Liao and Yang (2013)	Mobile applications	Functional value Emotional value Epistemic value Social value Conditional value	None

Al-Debei and Al-Lozi (2014)	Mobile data services	Utilitarian value Hedonic value Uniqueness value Epistemic value Economic value	None
Hsu and Lin (2015)	Paid mobile apps	Performance Value-for-money Emotional Social	None
de Kerviler *et al.* (2016)	M-payment	Perceived utilitarian benefits: convenience Perceived utilitarian benefits: economic and informational Perceived hedonic benefits: enjoyment Perceived hedonic benefits: experiential Perceived symbolic benefits: social	Perceived risks: privacy and financial
Omigie *et al.* (2017)	Mobile financial services	Convenience value Aesthetic value Monetary value Social value Epistemic value Conditional value Self-gratification value	None
Hong *et al.* (2017)	Smartwatch	Hedonic value Utilitarian value	None

Although the multidimensional approach to conceptualise value offers a comprehensive view about the benefits side, it has been criticised for ignoring diverse sacrifices, other than price, that can have determining influences on consumer perceptions of value (Wang, *et al.*, 2004; Kim, *et al.*, 2007). For this reason, some researchers have followed the assumptions proposed by the unidimensional approach to integrate nonmonetary sacrifice components into the multidimensional conceptualisation of value. For instance, de Kerviler, Demoulin and Zidda (2016) have included perceived risks as a

sacrifice construct in their multidimensional conceptualisation of value to study in-store (proximity) m-payment adoption. Interestingly, the authors have found that the perceived risks construct has the strongest effect on behavioural intention towards in-store m-payment as compared to other benefit constructs. This finding highlights the shortcoming of the multidimensional approach in omitting nonmonetary sacrifices, which proved to be particularly important in the m-payment context.

2.9.3 The Higher Order Construct Approach

Conceptualising perceived value as a higher order formative construct has been regarded as the most complete representation as it adequately captures the complexity of value from a theoretical perspective (Lin, Sher and Shih, 2005; Leroi-Werelds, 2019). Although Zeithaml's conceptualisation has clearly indicated that value is a higher order construct inferred from its lower order components, many researchers who adopted this conceptualisation have represented value as a measured unidimensional construct as shown in Table 2.1. A critical evaluation of this representation suggested that modelling the components of benefits and sacrifices as antecedents of a directly measured value construct considers them as separate concepts, hence violating the definition that these components are part of the perceived value construct (Lin, *et al.*, 2005). This representation has also been criticised for ignoring the complexity of perceived value as a rich concept composed of different facets (Ruiz, *et al.*, 2008). On the other hand, it has been argued that the absence of an overall value construct in the multidimensional approach renders any conclusions about perceived value as incomplete. This is because the results are drawn on the basis of the effects that the individual components of value have on intentions, rather than on the basis of the effect of value as an overall construct (Lin, *et al.*, 2005). To resolve these problematic representations, researchers have demonstrated that modelling perceived value as a multidimensional higher order formative construct with the different components of benefits and sacrifices as lower order constructs is consistent with the conceptual nature of value as a trade-off concept (Lin, Sher and Shih, 2005; Ruiz et al., 2008). Furthermore, Leroi-Werelds *et al.* (2014) has shown that the multidimensional higher order formative representation of value outperforms the unidimensional approach in terms of its ability to predict the outcome of interest (e.g. behavioural intention). This agrees with earlier findings that suggest conceptualising value as a higher order formative construct when the research objective is to assess its relationship with other constructs in the model (Lin, *et al.*, 2005).

The literature review summarised in Table 2.4 shows that only 4 technology adoption studies have pursued the higher order conceptualisation of value, suggesting that this approach is less common than the other two approaches. This could be attributable to the relatively recent development of the higher order conceptualisation of value (Zauner, *et al.*, 2015) and the complexity involved in this approach as compared to other approaches (Lin, *et al.*, 2005). Notably, most studies have employed the benefit components of the multidimensional approach to conceptualise the get side of value, which mainly includes utilitarian, emotional, and social dimensions. Other dimensions were also

added based on the nature of the technology being investigated. For example, Turel *et al.* (2010) included visual/musical appeal value to adapt the utilitarian aspect of value to the context of hedonic digital artefacts. In terms of sacrifices, Cocosila and Trabelsi (2016) integrated different types of risk under a formative overall risk construct to represent the sacrifice side of value in the m-payment context. The authors argued that consumer fears and uncertainties about the use of emerging services are considered as costs with negative influences on overall value. In contrast, no sacrifice components were included in the remaining studies. However, Turel *et al.* (2007, 2010) have indirectly accounted for cost by including value for money as a benefit component in the overall perceived value. In this regard, the authors indicated that value for money reflects an assessment of the other benefits received for the price paid.

Table 2.4 Applications of Higher Order Value Approach in Technology Adoption Research

Source	**Technology/Service**	**Benefits**	**Sacrifices**
Turel *et al.* (2007)	Short messaging services	Performance/quality value Emotional value Value-for-money Social value	None
Turel *et al.* (2010)	Hedonic digital artefacts	Visual/musical appeal value Social value Playfulness value Value for money	None
Cocosila and Trabelsi (2016)	M-payment	Utilitarian value Enjoyment value Social value	Overall risk
Wang, Gu, *et al.* (2019)	Ride-sharing services	Utilitarian value Hedonic value Social value	None

Based on the literature review discussed in this section, this study conceptualises perceived value as a higher order multidimensional formative construct for several reasons. First, it provides the most valid conceptual representation of value from a theoretical perspective. Second, it offers higher predictive ability of the outcome of interest. Previous technology adoption research has emphasised the importance of predictive ability as an indication of the conceptual model's adequacy in representing the underlying phenomenon (Taylor and Todd, 1995). In the context of this study, this means that the ability of perceived value to predict m-payment behavioural intention is stronger using

the higher order construct approach. Finally, pursuing the higher order construct approach was recommended for studies that aim to investigate the impact of other constructs on perceived value. Since this study seeks to investigate the effect of value-added services and other influential factors on perceived value as a predictor of m-payment behavioural intention, the higher order construct approach aligns with the aim of this study.

2.10 Added Value Concept and Value-Added Services

Marketing literature has offered a distinction between the concepts of value and added value through suggesting different approaches to increase the value of a market offering relative to competitors. Zeithaml (1988) broadly argued that each of the components of perceived value represents a potential direction for adding value, such as employing strategies to reduce nonmonetary sacrifices or evoking perceptions of relevant high-level abstractions. Another generic conceptualisation of added value was provided by de Chernatony, Harris and Dall'Olmo Riley (2000) who regarded it as a multidimensional construct that includes both functional and emotional benefits as perceived by consumers in comparison to alternatives. However, the authors did not clearly specify the relationship between added value as a multidimensional construct and consumer perceived value. Other researchers have specifically suggested that added value can be achieved through augmenting a core product or service with additional services (Grönroos, 1997). Different terms have been used to refer to additional services, such as 'supplementary services' (Lovelock, 1995), 'auxiliary services' (Goyal, 2004), and 'value-added services' (Anckar and D'incau, 2002). From a supply side perspective, the main role of additional services is to create a differentiation between the core product, which is typically available from other competitors, and an offered product that integrates additional features to achieve a competitive distinction (Levitt, 1980). On the demand side, researchers argue that additional services have a profound impact on consumer perceptions of value (Frow, Ngo and Payne, 2014) through increasing the benefits or reducing the sacrifices (Ravald and Grönroos, 1996) and consequently drive their choice decisions (de Chernatony, *et al.*, 2000; Goyal, 2004). In this regard, Goyal (2004) explained that when consumers are faced with multiple offers in the same market they tend to choose the offer that provides the best additional services. The impact of such additional services on customer perceived value was conceptualised by Grönroos (1997) in the following two equations:

$$Customer\ Perceived\ Value = \frac{Core\ Solution + Additional\ Services}{Price + Relationship\ Costs}$$

$$Customer\ Perceived\ Value = Core\ Value\ \pm Added\ Value$$

According to Grönroos (1997), the first equation resonates with Zeithaml's (1988) trade-off concept of value. The core solution along with additional services represent the 'get side' of the offering, whereas price and relationship costs resemble the 'give side'. The relationship in this context

involves the additional resources and activities that a firm offers beyond the core product to satisfy its consumers' value needs (Grönroos, 1997). Accordingly, the relationship costs include direct, indirect and psychological costs resulting from consumer relationship with the other party providing the product or service. Whilst direct costs can be calculated in terms of investments needed by the consumer to establish the relationship, indirect costs represent those incurred by the consumer as a result of service or product malfunction. On the other hand, psychological costs are perceived by consumers as a result of uncertainties or fears associated with the offering. In the second equation, Grönroos (1997) clearly distinguished between the core value offered by the core product and added value perceived in the additional services. The author argued that while the main intent of added value is to provoke perceptions of additional benefits and minimise indirect and psychological costs without any direct costs, it can also negatively impact the value of the core product if the additional services were poorly implemented. Therefore, it could be inferred from the above discussion that the additional benefits of value-added services can materialise in the form of direct perceived gains or indirectly through perceptions of reduced costs, or both.

Value-added services have been widely examined in the mobile telecommunication context (e.g. Yang and Jolly, 2006; Kuo, Wu and Deng, 2009; Wang and Li, 2012; Wang, 2015). The aim of this research stream was to examine consumer behavioural intentions towards value-added services as a technology. More specifically, researchers were interested to understand the factors that affect consumers' behavioural intentions towards mobile value-added services provided by MNOs along with the core voice call service, such as mobile internet, multimedia and short messaging services, and download services. For instance, Kuo, Wu and Deng (2009) have investigated consumers' post-purchase intention to use 3G mobile value-added services. The authors have relied on service quality, perceived value, and customer satisfaction as antecedents to the post-purchase behavioural intention. Similarly, Wang and Li (2012) have examined consumers' intention to purchase value-added services in terms of factors related to service attributes and brand recognition. This body of research has made significant contributions by highlighting the factors that impact consumers' perceptions towards value-added services per se. Nevertheless, there has been a noticeable paucity of research effort in examining the impact that value-added services have on consumer value perceptions and behavioural intentions towards the core service. Evidence from the existing limited research has shown a significant effect of value-added services as a benefit component of perceived value of the core service. For example, Lin *et al.* (2012) have used perceived value theory to examine the continuance intention to use on-demand multimedia services. In doing so, they conceptualised perceived benefits and perceived sacrifices as second order constructs that predict perceived value as a measured construct. Value-added services were included as a benefit component along with personalisation, high quality and content richness. Although the findings indicated that value-added services had the second strongest effect on perceived benefits after personalisation, the authors did

not examine any direct effects of value-added services on overall perceived value or the continuance intention to use the core service in question.

2.11 Value-Added Services in Mobile Payment Adoption Research

Many research studies have proposed that the integration of value-added services would boost the consumer's perceived value of m-payment and promote adoption (Gannamaneni, *et al.*, 2015; Gerpott and Meinert, 2017; Johnson, *et al.*, 2018; Wang, Luo, *et al.*, 2019). However, existing research offers little empirical evidence to support such a suggestion. The literature review has revealed a limited number of studies that have examined value-added services in the m-payment context. In an early qualitative conceptual study, Dahlberg and Mallat (2002) employed Grönroos's (1997) conceptualisation of perceived value (based on the equations discussed in the previous section) to elicit m-payment service features perceived to create value for consumers. Their findings suggest that consumers perceive the value of m-payment in specific use situations, such as small amount purchases and purchases from automated vending machines. However, the findings did not clearly indicate any additional services or examine their role in enhancing the value of the core payment service, as conceptualised by Grönroos.

Another study by Augsburg and Hedman (2014) investigated the role of value-added services in m-payment adoption. The authors employed factors from TAM (perceived usefulness, perceived ease of use) and DOI (compatibility) in addition to convenience and use intention as dependent variables. The effect of value-added services was examined by comparing the means of the dependent variables across two groups of participants in a survey experiment. The control group included a description of m-payment service while the experiment group included an additional description of a combination of value-added services, namely storing digital receipts, storing loyalty cards, and automatic coupons to be offered collectively along with the m-payment service. The findings indicated that value-added services had a positive impact on perceived usefulness, compatibility, convenience and adoption intention whereas no effect was detected on perceived ease of use. These findings offer useful insights about the role of value-added services in enhancing perceptions about a selected set of m-payment service attributes and behavioural intention. However, although the authors hypothesised that value-added services will increase m-payment's perceived value and positively affect adoption intention, their conceptual model was not based on the premises of perceived value to fully validate this assumption. Consequently, no empirical evidence was provided to support or reject the presumed positive relationship between value-added services and perceived value. Furthermore, the authors have indicated that other important factors related to the context of m-payment adoption, such as perceived risk and trust, were not included in the study. In this regard, the authors argue that the aim of the study is limited to examining the effect of value-added services on the selected factors rather than investigating their effect as part of a comprehensive structural adoption model addressing relationships among such factors. Another limitation acknowledged by

the authors is that the study examined the suggested value-added services as one bundle. This suggests that the effect of value-added services on the selected factors might not fully reflect the actual perceptions of the participants due to their different preferences towards each of the suggested value-added services.

Balachandran and Tan (2015) followed a different approach by including a designated construct for value-added services they named as 'variety of services' as an antecedent of m-payment adoption intention in the structural model. In addition to value-added services, the authors included constructs from DOI (relative advantage, complexity, compatibility) along with 'amount of information' and 'perceived financial resources'. Although the authors have exemplified some potential m-payment value-added services such as automatic transportation ticketing and loyalty programs integration, the study has only examined the general idea of including a variety of services without specifying any particular service. The findings indicated that the 'variety of services' construct had the strongest positive impact on m-payment adoption intention as compared to the other constructs. However, the model has only explained 34.1% of the variance in the outcome variable. According to the authors, the relatively weak predictive power of the model could be attributed to the fact that other important factors were not included in the model, such as risk and availability of other payment methods. Indeed, a study by Slade, Williams, *et al.* (2015) has proved that the inclusion of perceived risk and trust as predictors of m-payment adoption intention has improved the model's predictive power as compared to the same model without such predictors. Furthermore, the same study has shown that introducing the factors of risk and trust to the model has resulted in the effect of some other constructs losing statistical significance. This raises questions about the strong effect exhibited by the 'variety of services' construct found in Balachandran and Tan's (2015) study on m-payment adoption intention. More specifically, the absence of known influential predictors, such as perceived risk and trust, might have led to inaccurate conclusions about the strength of the effect of 'variety of services' on m-payment adoption intention.

2.12 Research Issues

Existing research has provided significant knowledge about the factors that consumers might consider when adopting m-payment. However, despite acknowledging the importance of the role of value and added value as determinants for the success of the m-payment, little empirical effort has been made to investigate such a role. Based on the literature review that covered m-payment adoption research and the conceptual approaches to perceived value, the following research issues have been identified:

- **Lack of understanding of m-payment perceived value:** the richness of value as a highly subjective concept (Woodruff, 1997) suggests the need for a deeper understanding of m-payment value by eliciting insights directly from consumers. Although previous m-payment adoption

studies have offered some useful findings about consumers' perceptions of m-payment value (e.g. Cocosila and Trabelsi, 2016; de Kerviler, Demoulin and Zidda, 2016), such studies were purely quantitative in nature. Quantitative methods are inherently based on data reduction principles that reduce the complexity of human-technology interactions to quantifiable relations (Wu, 2012). Thus, complementing quantitative methods with qualitative methods seems likely to offer a better understanding of the concept in question. This is particularly important when the concept of interest is in the complexity and richness of perceived value.

- **Lack of evidence on the effect of value-added services on perceived value:** the suggestion that many researchers have provided on the role of value-added services as a means to add value to m-payment has not been empirically supported. The limited number of studies that have examined the effect of value-added services in the context of m-payment did not employ the theoretical basis that postulates the relationship between value-added services and perceived value as discussed in section 2.10. Therefore, providing empirical evidence that examines such a relationship and its subsequent impact on m-payment behavioural intention would be a significant contribution to value-based technology adoption research in general, and to m-payment adoption in particular.
- **Limited research on m-payment adoption in the context of the UK:** the literature review revealed that m-payment adoption research undertaken in the context of the UK is scarce. Apart from Slade, Williams, *et al.* (2015), who studied m-payment adoption through the lens of UTAUT2, there is a lack of research that specifically investigates consumer adoption of proximity m-payment in the UK. More importantly, no studies have been found which examine m-payment value perceptions among UK consumers. Given the fact that consumers' perceptions of value are specific to the social and cultural contexts to which they belong (Yang and Jolly, 2009), this research offers an original contribution to fill this gap by providing a holistic analysis about the way consumers in the UK perceive value and added value of m-payment.

2.13 Summary

This chapter has presented and discussed the relevant literature of m-payment adoption research. The scope of current research has been identified by discussing the different research streams related to m-payment research to highlight the main topics addressed by previous studies. This has provided a holistic overview about the different stakeholders involved in the m-payment ecosystem, the technological approaches used to realise m-payment, and the rationale behind understanding consumer behaviour in the m-payment context. By reviewing the main theories used to model consumer behaviour, this chapter has highlighted the factors that previous studies investigated along with the strengths and weaknesses of such theories in relation to their suitability for m-payment adoption research. This has also helped to select the perceived value theory as an appropriate theoretical foundation that fits the aim of this research to study the effect of value-added services as

a form of added value. The discussion of the different conceptualisations of perceived value has led to the selection of its higher order multidimensional model. This was deemed to be the most appropriate representation of value in terms of predictive ability based on evidence from previous studies. Finally, this chapter has highlighted the significance of this study by outlining the knowledge gaps identified in existing literature. The literature review discussed in this chapter has formed the foundation for developing the theoretical framework in the next chapter.

Chapter 3 Proposed Research Model and Hypotheses

3.1 Overview

The previous chapter provided a review of the several theories and models that have been used to model m-payment behavioural intentions. It has also illustrated that previous m-payment adoption research has not fully examined the effect of value-added services on m-payment perceived value and other influential factors pertinent to m-payment adoption. The primary objective of this chapter is to propose and develop a conceptual model that addresses these issues. It also explains and justifies the selection of the model's constructs and their hypothesised relationships based on the identified gaps in existing literature and the current state of knowledge. The selection of an appropriate model to represent a given phenomenon should consider two criteria: parsimony and contribution to understanding (Taylor and Todd, 1995; Choudrie and Dwivedi, 2004). Model parsimony pertains to achieving a good predictive ability using the fewest number of predictors. Contribution to understanding is the ability of such predictors to capture the different aspects needed to sufficiently understand the phenomenon of interest. In order to understand the effect of value-added services on m-payment adoption, the current study adopts a balanced approach between both criteria. Parsimony is achieved through representing perceived value at a high level of abstraction, which has been recommended as the optimal approach in terms of its predictive ability towards behavioural intentions (Ruiz, *et al.*, 2008; Leroi-Werelds, *et al.*, 2014). The current study employs this abstract representation to examine the effect of value-added services on perceived value as a sole predictor of m-payment use intention. The second criterion, contribution to understanding, is achieved through including other constructs, namely perceived trust and risk, that have been shown to be important to understand consumer adoption of m-payment (Slade, Williams, *et al.*, 2015). This allows for assessing the effect of value-added services on such constructs that were deemed as critical determinants of m-payment adoption behaviour among consumers.

The remainder of this chapter is structured as follows. Section 3.2 discusses the components of perceived value and provides evidence from previous research to illustrate their relevance to m-payment adoption. It also draws on previous research to hypothesise the relationship between perceived value as a higher order construct and m-payment use intention. Section 3.3 illustrates the importance of trust in m-payment providers and its relationship to m-payment perceived value. In section 3.4, the effect of value-added services on other constructs in the model is hypothesised based on the conceptual understanding of perceived value. Finally, a summary of the chapter is provided in section 3.5.

3.2 Perceived Value

As discussed in the previous chapter (section 2.9), perceived value has been widely interpreted among technology adoption researchers as a trade-off concept that involves the evaluation of multiple components of benefits and sacrifices. It has also been shown that this concept should be represented as a higher order multidimensional construct formed from its lower order components of benefits and sacrifices (Ruiz, *et al.*, 2008). The literature offers well-established evidence for the positive effect of perceived value as a single higher order predictor composed of a combination of benefit and sacrifice components on behavioural intentions (Turel, *et al.*, 2007; Cocosila and Trabelsi, 2016). Such evidence is based on the theoretical assumption that indicates the higher the benefits that consumers perceive in a technology-based service as compared to sacrifices, the more likely they are to adopt such service (Kim, *et al.*, 2007). For instance, Turel, Serenko and Bontis (2010) have shown that the perceived value of digital hedonic artefacts has a significant positive effect on behavioural intentions towards use and willingness to provide positive word-of-mouth recommendations. Likewise, Cocosila and Trabelsi (2016) have illustrated that perceived value is positively related to the behavioural intention to use m-payment. Therefore, the relationship between the overall perceived value and the behavioural intention to use m-payment is hypothesised as follows:

H1: Perceived Value of m-payment has a positive effect on its Use Intention.

The current study follows previous research (e.g. de Kerviler, Demoulin and Zidda, 2016) by drawing on Sweeney and Soutar's (2001) PERVAL scale to conceptualise the benefit components of value. Benefits are represented in terms of convenience value, monetary value, enjoyment value, and social value components, whereas perceived risk represents the sacrifice component. Monetary sacrifices such as cost and price were not included due to their irrelevance to the context of m-payment as suggested by many previous studies (e.g. Oliveira *et al.*, 2016; Moorthy *et al.*, 2019). The following sub-sections demonstrate the relevance of the selected value components to the context of m-payment.

3.2.1 Convenience Value

According to Sweeney and Soutar (2001), functional value represents two conceptually distinct value dimensions representing performance and economic utilities. These dimensions were deemed to be the primary driver of consumer choice (Sheth, *et al.*, 1991) and were considered as the consumer's return on investment of financial, temporal, behavioural and psychological resources (Mathwick, Malhotra and Rigdon, 2001). In the context of mobile services, the performance aspect of functional value has been regarded as the convenience of fulfilling a task (Pura, 2005). Researchers have argued that convenience represents one of the main value drivers of mobile commerce applications (Anckar and D'incau, 2002). Brown (1990) suggested that service convenience comprises four dimensions, namely time, place, acquisition and use. While time and place convenience involve reducing

temporal and spatial limitations of service access, acquisition and use convenience pertain to the ease of acquiring and using the service. As such, convenience value appears to be of a particular importance within the context of m-payment due to the ubiquity of the mobile device (Zhou, 2013). Furthermore, convenience has been found to impact positively on m-payment adoption intention (de Kerviler, *et al.*, 2016; Gao and Waechter, 2017). Against this background, this study conceptualises convenience value as the consumers' perceived utility from the ease of signing up to and use of m-payment as a service accessible anytime and anywhere.

3.2.2 Monetary Value

Monetary value is the other dimension of functional value that refers to the value the consumer perceives in a product or service for the money paid at an acceptable price level (Sweeney and Soutar, 2001; Pura, 2005). This 'value for money' concept is particularly relevant when acquiring or using a service involves monetary costs. However, monetary value has also been conceptualised as the economic benefit that consumers perceive in a product or service's ability to save money. Pihlström and Brush (2008) argued that all mobile services are often utilised to save money, thus the perceived monetary value can positively impact their adoption. Consumer perceptions of the monetary value of a service can be classified into direct and indirect financial benefits. Direct financial benefits include receiving financial incentives that providers offer to promote using their service, such as loyalty programs, cashback, discounts, coupons, etc. (Meuter, *et al.*, 2000; Mimouni-Chaabane and Volle, 2010; Liu, Zhao, *et al.*, 2015). Indirect financial benefits can be perceived through service features that enable consumers to spend less. For instance, it has been shown that consumers are often inclined to use one of the available traditional payment instruments (i.e. credit card, debit card, cash, cheque) that enables them to control their expenditure and help with budgeting (Ching and Hayashi, 2010). In light of these findings, Hayashi (2012) anticipated that the emerging m-payment service has higher potential than traditional payment instruments in terms of its ability to offer financial management and spending control features. While such features could positively affect adoption among consumers, the author asserted that the magnitude of such an effect is uncertain. The economic benefit of m-payment has been found to positively impact the intention to use it for in-store payment (de Kerviler, *et al.*, 2016; Park, *et al.*, 2019). Drawing on this argument, this study conceptualises monetary value as the consumer's perceived utility of the money savings resulting from using m-payment.

3.2.3 Enjoyment Value

Also termed as emotional or hedonic value, enjoyment value refers to the utility perceived by consumers from the ability of a product or service to trigger positive feelings or affective states (Sheth, *et al.*, 1991; Pura, 2005). As an important determinant of technology acceptance and use, Venkatesh, Thong and Xu (2012) defined hedonic motivation as the "fun or pleasure derived from using a technology". Existing research has suggested that consumer behavioural intentions towards

technology-based services are not only driven by the utilitarian aspects of value, i.e. convenience value and monetary value, but also emotional aspects. This applies to mobile services that are used for utilitarian or entertainment purposes (Pihlström and Brush, 2008). Previous studies have found a positive relationship between enjoyment value and perceived value of m-payment (Koenig-Lewis, *et al.*, 2015; Cocosila and Trabelsi, 2016). Interestingly, other studies have indicated that enjoyment value is one of the most important drivers to m-payment adoption (de Kerviler, *et al.*, 2016; Park, *et al.*, 2019). Consistent with these findings, this study conceptualises enjoyment value as the positive feelings that consumers perceive to be associated with using m-payment.

3.2.4 Social Value

Social value reflects the extent to which a product or service enhances social self-image and interpersonal communication in a social setting (Sheth, *et al.*, 1991; Sweeney and Soutar, 2001). The social aspect addresses how appreciation from important others with regards to using a given service is perceived by the concerned individual in terms of self-esteem improvement (Park, *et al.*, 2019). In this regard, consumers associate a social value to services that enable them to reflect a unique social identity that can be recognised by others (Magids, Zorfas and Leemon, 2015). Social value has been found to be an influential factor in the context of m-payment adoption among consumers. For example, a direct positive relationship has been found between social value and consumer's intention to adopt m-payment (de Kerviler, *et al.*, 2016). Furthermore, social value was found to positively contribute towards consumer's perceived value of m-payment (Cocosila and Trabelsi, 2016). Therefore, this study conceptualises social value as a source of self-appreciation perceived from the impression conveyed by peers in a social context with regards to using m-payment.

3.2.5 Perceived Risk

Perceived risk is defined as "the consumer's subjective belief of suffering a loss in pursuit of a desired outcome" (Pavlou, 2003). Such belief is derived from feelings of uncertainty associated with a behaviour and is evaluated in terms of perceptions about the seriousness or importance of potential negative outcomes of that behaviour (Slade, Williams, *et al.*, 2015). Perceptions of uncertainty have a profound effect on consumer decisions, especially when such decisions are related to financial services. Goyal (2008) noted that financial services are intangible and complex to understand, thus consumers perceive potential risks due to their inability to predict the consequences of their decisions to use such services. Perceptions of risk have also been linked to lack of familiarity with new services (de Kerviler, *et al.*, 2016) – which is particularly relevant to the case of m-payment as an emerging payment instrument (Johnson, *et al.*, 2018). Perceived risk has received a great deal of attention among m-payment adoption researchers as an important barrier that involves concerns about possible security threats impeding its adoption (Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva, 2014). Whilst some researchers have conceptualised perceived risk as a single construct that captures the overall perceived risk (Koenig-Lewis, *et al.*, 2015; Slade, Williams, *et al.*, 2015; Liébana-

Cabanillas, Muñoz-Leiva and Sánchez-Fernández, 2018), others have investigated risk as a combination of multiple constructs reflecting the different facets of risk (i.e. time, psychological, social, privacy) (Cocosila and Trabelsi, 2016). Although both representations were shown to be successful, the single construct representation of risk offers a better approach in terms of model parsimony (Slade, Williams, *et al.*, 2015). This is particularly important when the focus is to understand the effect of other diverse factors on m-payment adoption as in the case of the current study. Thus, perceived risk will be modelled as a single construct that reflects the overall risk perceived by consumers. Research has shown that perceived risk has a direct negative effect on both adoption intention and perceived value of m-payment (Yang, *et al.*, 2015). The negative contribution of perceived risk as a nonmonetary sacrifice component towards the overall perceived value of m-payment has also been confirmed (Cocosila and Trabelsi, 2016). Thus, the current study conceptualises perceived risk as a nonmonetary sacrifice component of value and defines it as the consumer's belief of uncertainty regarding the security of m-payment.

The relationships between the above benefit and sacrifice constructs and the higher order construct of overall perceived value represent their contributions towards the formation of perceived value (this will be discussed in more detail in Chapter 6). As discussed in the previous subsections, findings from previous m-payment adoption research suggest that all the benefit constructs are positively related to perceived value, whereas the sacrifice construct of perceived risk has a negative relationship. Given the scarcity of m-payment adoption research in the context of the UK, and the highly contextual nature of perceived value in respect of consumers' cultural backgrounds (see Section 2.12), the following hypotheses are proposed:

H2a: Convenience Value of m-payment has a positive contribution towards its Perceived Value.

H2b: Monetary Value of m-payment has a positive contribution towards its Perceived Value.

H2c: Enjoyment Value of m-payment has a positive contribution towards its Perceived Value.

H2d: Social Value of m-payment has a positive contribution towards its Perceived Value.

H2e: Perceived Risk of m-payment has a negative contribution towards its Perceived Value.

3.3 Trust in Provider

Trust entails the willingness to be vulnerable to the actions of another party based on positive expectations towards the future behaviour of that party (Mayer, Davis and Schoorman, 1995; Zhou, 2013). In the context of distant commercial relationships that lack direct personal communication, trust has been considered as a central notion where perceptions of uncertainty become dominant (McKnight and Chervany, 2001). Previous research indicated that consumers rely on a number of characteristics to evaluate the trustworthiness of online service providers such as firm size, reputation, honesty, and benevolence (Jarvenpaa, Tractinsky and Vitale, 2000; Lee, Kang and

McKnight, 2007). In a similar vein, m-payment adoption researchers have suggested that perceptions about service providers' reputation and opportunism affect the consumer's trust in m-payment service (Chandra, *et al.*, 2010). Zhou (2011) has shown that trust in m-payment providers has a positive effect on m-payment use intention through three consumer beliefs: ability, integrity, and benevolence. Ability is the consumer's belief that providers have the needed skills to fulfil their obligation. Integrity pertains to the belief that they keep their promise, and benevolence is the belief that they care about consumer's interests. In addition, trust in providers has been regarded as an important factor in the context of m-payment systems due to their complexity in terms of the multiple stakeholders involved in the provision of the service (Slade, Williams, *et al.*, 2015). Although previous research has established a positive effect of trust in provider on m-payment adoption intention using technology adoption models (e.g. UTAUT) (Slade, Williams, *et al.*, 2015; Khalilzadeh, *et al.*, 2017), little research has been conducted to investigate such an effect using a value-based approach. However, earlier research suggests that trust in providers positively influences consumer value perceptions towards the services they provide through the relational benefit of interacting with competent and benevolent providers (Sirdeshmukh, Singh and Sabol, 2002). For instance, a study by Kim, Xu and Gupta (2012) has shown that consumers' perceptions of trust towards online vendors has a positive effect on perceived value of online shopping. In this regard, the authors noted that trust in provider positively affects perceived value by reducing the nonmonetary cost of risk. This negative effect of trust on perceived risk has also been confirmed in the m-payment adoption context (Slade, Williams, *et al.*, 2015). Therefore, it could be concluded that perceptions of trust in m-payment providers positively affect m-payment perceived value by increasing perceptions of benefits and reducing perceptions of sacrifices. Although the effect of trust on the perceived value of m-payment has not been investigated in extant literature, the following hypothesis is proposed based on the reasoning discussed above:

H3: Perceived Trust in Provider has a positive effect on the Perceived Value of m-payment.

3.4 Value-Added Services

As discussed in Chapter 2 (section 2.10), value-added services refer to additional or supplementary services that are offered along with the m-payment service to enhance the consumer's perceived value. Marketing literature conceptualises these additional services as a means that supports the core service by adding value and minimising costs involved in service relationships (Grönroos, 1997). Within the context of financial services, supplementary services associated with credit cards, such as revolving credit and cash withdrawal from automated teller machines, have been found to enhance their functional value and reduce the associated psychological risks (Goyal, 2008). Although previous studies have repeatedly suggested that value-added services would enhance the perceived value of m-payment (de Reuver, *et al.*, 2015; Madureira, 2017), no empirical evidence was provided to support such suggestions. For the purpose of this study, three value-added services, namely instant

account balance, loyalty card integration, and cashback rewards, have been chosen as exemplars to evaluate how their inclusion affects the theorised constructs. The choice was based on literature suggestions as well as relevance to the UK market as discussed below:

- **Instant balance**: The integration of account balance checking service has been suggested as a means to promote adoption of m-payment by increasing its value as compared to alternative payment methods. For example, Hayashi (2012) argued that the integration of balance account checking into m-payment solutions offers consumers a better way to control their spending and manage their finances. Similarly, Madureira (2017) exemplified the account balance inquiry service as a value-added service that could potentially increase the attractiveness of m-payment given the fierce competition from existing well-established payment instruments. In the context of the UK, the introduction of the open banking initiative in January 2018 has opened the space for regulated payment service providers to offer account information services to consumers upon their consent (Zachariadis and Ozcan, 2017). Thus, the selection of instant account balance is relevant and timely to understand how UK consumers would perceive value in future m-payment apps featuring this value-added service.
- **Loyalty card integration**: Subscription to loyalty card programmes offered by high street retailers is a common trend in the UK population. According to a market research survey by YouGov (2018), three quarters of the UK population are subscribed to at least one loyalty scheme. Integrating loyalty schemes into m-payment apps has been suggested as another value-added service to incentivise consumers to adopt m-payment (de Reuver, *et al.*, 2015; Madureira, 2017). The digitalisation of loyalty schemes into m-payment apps eliminates the need to carry physical loyalty cards and simplifies the payment process. Although some existing m-payment apps offer the functionality of storing loyalty cards, such as Apple Pay, understanding of its impact on m-payment value as a determinant of behavioural intention is scarce.
- **Cashback**: As a form of financial incentive, cashback is a monetary reward where consumers get money back when using a particular payment instrument to pay for certain products (Apanasevic, *et al.*, 2016). Previous research suggests that UK consumers are encouraged to use proximity m-payment apps that offer financial incentives (Slade, Williams, *et al.*, 2015). Furthermore, a qualitative case study that investigated consumer expectations of m-payment services offered by Swedish companies indicates that cashback was perceived by consumers as an added value in terms of economic benefits (Apanasevic, *et al.*, 2016). However, little is known about the effect of financial incentives on the overall perceived value of m-payment.

The theoretical reasoning discussed in section 2.10 indicates that added value has a positive effect on perceived value through increasing perceptions of benefits and reducing perceptions of sacrifices (Zeithaml, 1988). Therefore, as a form of added value, value-added services are expected to have a positive effect on the perceived value of m-payment. Furthermore, marketing researchers noted that core services bundled with value-added services gain a competitive advantage over other market offerings of the same core service (Lovelock, 1995). As such, it can be inferred that value-added services can generally be regarded as an indication of the provider's competence. Thus, assuming that consumers perceive an added value beyond that offered by the core service, value-added services are expected to positively impact perceptions of trust in provider. In order to fully comprehend the effect of value-added services in light of the above argument, the following hypotheses are proposed:

H4a: Value-Added Service has a positive effect on Perceived Value of m-payment.

H4b: Value-Added Service has a positive effect on Trust in Provider of m-payment.

Based on the above research hypotheses, the proposed research model is shown in Figure 3.1.

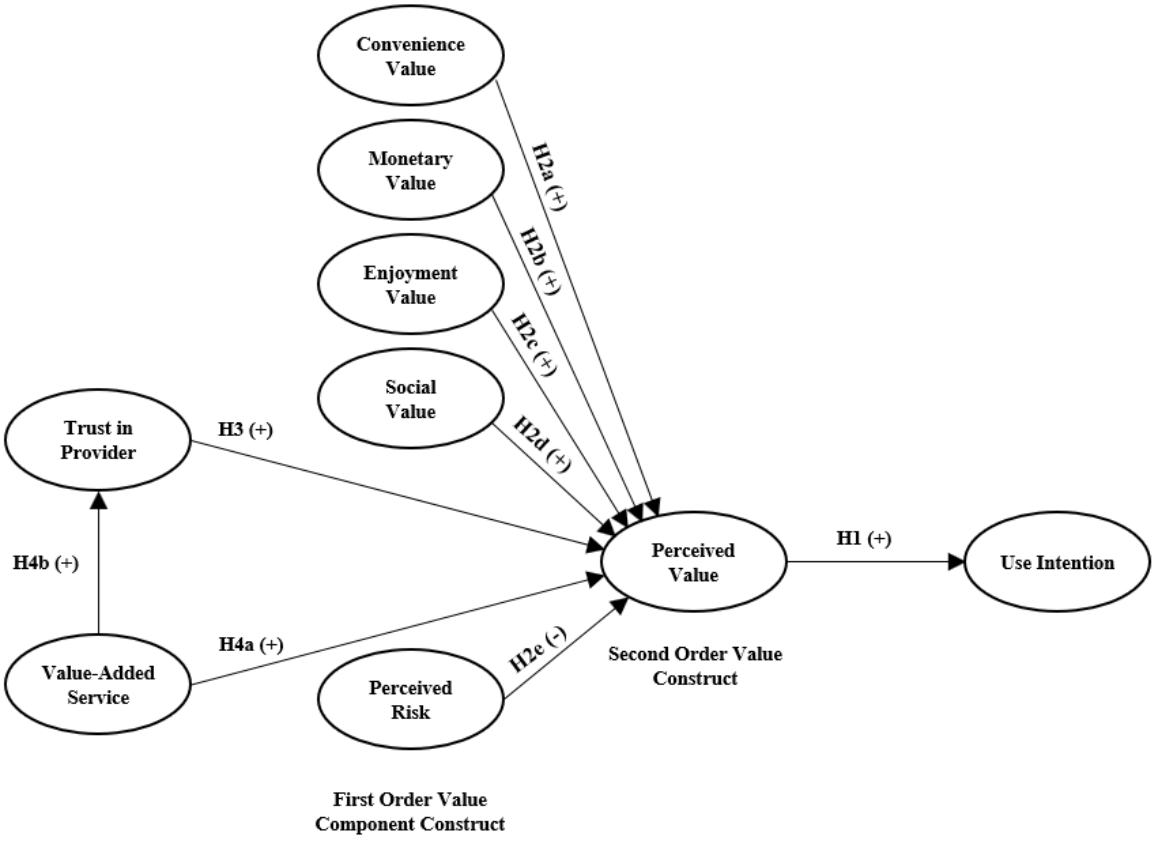

Figure 3.1 The Proposed Research Model and Hypotheses

The model illustrates the concept of perceived value as a formative higher order construct that predicts m-payment use intention through a positive relationship. The lower order constructs of

convenience value, monetary value, enjoyment value and social value are the benefit components of value, whereas perceived risk is the sacrifice component. Each of these components represents a distinct aspect of value which contributes to the formation of overall perceived value. The model also hypothesises trust in provider and value-added service as antecedents to perceived value that are positively related to it. In addition, value-added service is hypothesised to be positively related to trust in provider.

According to the literature review discussed in section 2.9, the proposed model is the first to demonstrate the relationship between value-added service and trust in provider with perceived value in the m-payment context. Although previous studies have investigated the effect of perceived value on m-payment use intention (Cocosila and Trabelsi, 2016; de Kerviler, *et al.*, 2016; Lin, *et al.*, 2018), no effort has been made to examine the effects of value-added service and trust in provider on the perceived value of m-payment. The proposed model thus offers an original contribution to the development of m-payment adoption theories from a perceived value perspective.

3.5 Summary

This chapter has presented the proposed research model to investigate the effect of value-added services on intention to use m-payment. The proposed model has been based on perceived value theory. This has been judged to be an appropriate theoretical foundation for studying the hypothesised added value that value-added services are supposed to provide. In order to fully understand the effect of value-added services, the relevant components of benefits and sacrifices in addition to trust in provider were incorporated into the model. The components of benefits include convenience value, monetary value, enjoyment value and social value. Perceived risk was included as a sacrifice component. The primary aim of the model is to measure the effect of value-added services on the constructs that have been previously shown to be relevant to the context of m-payment adoption research. The relationships among the selected constructs have been proposed in the form of 9 hypotheses. The research methodology that will be employed to empirically assess and analyse the proposed model will be discussed in the next chapter.

Chapter 4 Research Methodology

4.1 Overview

The previous chapter proposed a conceptual model that aims to examine the effect of value-added services on m-payment adoption by consumers. This chapter aims to discuss commonly used research approaches to guide the selection of an appropriate approach for validating the proposed conceptual model. The research approach, which generally refers to the research methodology, is considered to be the plan and procedures that a researcher undertakes to accomplish the research aim. Based on the literature review, this thesis has identified three main research approaches: qualitative, quantitative, and mixed methods. According to Creswell (2014), the decision to choose one of these approaches is informed by three selection criteria: the research paradigm, the research design, and the specific methods employed to collect, analyse and interpret data.

This chapter is organised as follows. Section 4.2 discusses the philosophical assumptions of the main research paradigms adopted in information systems research and provides a justification for selecting the research paradigm for this study. Section 4.3 outlines different research designs associated with the chosen research paradigm. It also identifies the design considered to be most appropriate for achieving the proposed research objectives. Sections 4.4 and 4.5 discuss and justify specific research methods used in data collection and analysis. They also illustrate respective validity measures taken to ensure the research credibility. The measures followed to meet the research ethics principles are described in section 4.6. Finally, section 4.7 provides a summary of the chapter.

4.2 Research Paradigm

The research paradigm refers to a set of philosophical assumptions that researchers adopt to define and acquire knowledge (Myers, 1997; Hassan, Mingers and Stahl, 2018). Four main research paradigms have been identified in information systems research: positivist, interpretivist, critical research, and pragmatist (Orlikowski and Baroudi, 1991; Mingers, 2001; Venkatesh, *et al.*, 2013). The philosophical assumption of the *positivist* paradigm follows a deterministic approach in which outcomes are determined by causes based on a priori theory (Creswell, 2014). Researchers who adopt this paradigm assume that reality is objectively given in the form of a theory comprising a set of measurable variables (Myers, 1997). The use of a predefined theory aims to deductively generate hypotheses that can be tested to understand a given phenomenon (Bryman, 2012; Creswell, 2014). Typically, the hypotheses are meant to test the direction and significance of relationships between the variables in the theory. The essential premise of this paradigm is objectivity in the sense that reality is investigated in isolation from the researcher's own beliefs (Orlikowski and Baroudi, 1991). For this reason, the methods employed under this research paradigm must be examined for bias through quantitative measures, such as validity and reliability (Creswell, 2014). Studies that employ the positivist paradigm are mostly quantitative by design. Thus, the method of inquiry follows a form

of close-ended questions (e.g. surveys) that intend to generalise the findings from a sample of a population.

The *interpretivist* paradigm, also known as a constructivist paradigm, assumes that reality can only be accessed through social constructions such as language, consciousness, and shared meanings (Myers, 1997). Since individuals develop varied subjective meanings for a given phenomenon, researchers that adopt this paradigm attempt to look for the complexity of these meanings in order to generate inductively the patterns that best explain such a phenomenon (Creswell, 2014). This highlights the difference between the deductive reasoning of the positivist paradigm and the inductive reasoning that characterises this paradigm. Whilst the former uses data to validate hypotheses generated from a pre-existing theory, the latter aims to develop a theory based on the inferred data patterns. The direct interaction between the researcher and the participants implies that the inferences drawn from data patterns are specific to the context of both the researcher's and participants' experiences and cultural backgrounds (Creswell, 2014). The interpretivist paradigm is mostly employed by qualitative researchers, whose method of inquiry aims to elicit a detailed account of experiences and perspectives through open-ended questions (Kaplan and Maxwell, 2005).

The philosophical assumption of *critical research*, also known as the transformative paradigm, focuses on criticising the status quo within social systems by confronting social oppression caused by alienation and domination (Myers, 1997; Creswell, 2014). Within information systems research, critical research is concerned with social issues such as freedom, power, social control, and values associated with the development, use, and impact of information technology (Myers and Klein, 2011). According to Orlikowski and Baroudi (1991), critical researchers believe in the ability of people to change their social circumstances, yet this ability is constrained by the dominating systems of economic, political, and cultural authority. By integrating political and social change agendas, critical research aims to transform the lives of those affected by social oppression through helping to eliminate the causes of alienation and domination (Myers, 1997; Creswell, 2014). The transformative philosophy of critical research is thus different from the positivist and interpretive research philosophies, which respectively focus on predicting and explaining the status quo (Orlikowski and Baroudi, 1991; Myers and Klein, 2011).

The *pragmatist* paradigm focuses on the research problem without imposing restrictions on the philosophical stance (Creswell, 2014). This paradigm has been regarded as the underlying assumption of a mixed methods design, where researchers employ pluralistic approaches to derive knowledge about the research problem (Tashakkori and Teddlie, 2010). According to Venkatesh, Brown and Bala (2013), researchers who adopt this paradigm emphasise the importance of the research questions and select the methods that help to obtain useful answers to these questions. In doing so, they liberally use the assumptions that underpin the qualitative and quantitative designs to

fulfil the aim of their research (Creswell, 2014). Therefore, the logic of inquiry that pragmatists follow include the use of deduction, induction, and abduction (Johnson and Onwuegbuzie, 2004). Whilst deduction and induction are the dominant approaches used in quantitative and qualitative designs respectively, abduction combines both approaches to provide the best set of explanations for the obtained results (Johnson and Onwuegbuzie, 2004; Venkatesh, *et al.*, 2013). Since the focus of this paradigm is on the research problem, it concerns itself with actions and consequences that provide practical solutions to such problem (Creswell, 2014). Given that actions represent a means of change, they must be guided by purpose and knowledge to create the change that leads to the desired consequences (Goldkuhl, 2012). In this regard, Goldkuhl (2012) argues that actions and their consequences represent the essence of the pragmatist paradigm as it views the meaning of a given concept to be the practical consequences of that concept.

Based on the review and analysis of the four research paradigms, the pragmatist paradigm was considered as the most appropriate paradigm for this study for two primary reasons. First, the current study's main aim is to investigate the effect of integrating value-added services into m-payment solutions on consumers' intention to adopt such solutions. This integration can be considered as an action of change that aims to increase the perceived value of m-payment and, consequently, promote its adoption. Since the pragmatist paradigm is concerned with actions and their practical consequences, adopting it as the underlying assumption was appropriate to achieve the aim of the current study. Second, achieving the main aim of this study relies on two essential objectives: understanding the concept of value in the m-payment context and assessing the effect of value-added services on m-payment value. As has been illustrated in Chapter 2 (section 2.9), perceived value is a highly subjective concept that holds different meanings among different consumers. Thus, gaining an in-depth understanding of this meaning follows the assumptions of the interpretivist paradigm. On the other hand, drawing conclusions about the effect of value-added services based on the theoretical representation of value is in line with the underlying philosophy of the positivist paradigm. Therefore, combining the assumptions of both paradigms into a single study is justified by adopting the assumptions of the pragmatist paradigm.

4.3 Research Design

The research design provides a framework that guides the collection and analysis of data (Bryman, 2012). It does so by specifying the type of inquiry that a researcher follows within the chosen research approach (Creswell, 2014). Since the current study adopts the pragmatist paradigm, a mixed methods research approach will be followed. Information systems researchers have highlighted the importance of mixed methods as a suitable approach that fits their diverse research contexts. This is due to the interdisciplinary nature of information systems domain which draws upon a wide range of fields that employ different research approaches (Mingers, 2001). Furthermore, mixed methods research has been suggested as a suitable approach to overcome inherent weaknesses of a single

research approach (qualitative or quantitative) in order to better understand a given phenomenon (Dennis and Valacich, 2001).

The rapid integration of technology into the daily life of individuals has increased the need for multiple research approaches to understand adoption of emerging technology systems with which consumers interact. This is due to the fact that existing information systems theories were mainly developed for work-related contexts and may not sufficiently explain adoption of such systems (Venkatesh, *et al.*, 2013). Against this background, Venkatesh *et al.* (2013) have discussed three main advantages of employing a mixed methods approach in the context of information systems research. First, the mixed methods approach provides a means to conduct exploratory and confirmatory studies within a single research study. While the former has been the typical approach of qualitative information systems studies which aim to understand a new phenomenon, the latter have largely featured in quantitative studies for theory testing. Second, the mixed methods approach can address the weaknesses of both qualitative and quantitative approaches by integrating their complementary strengths. The qualitative approach is often concerned with the depth of data collection, whereas the quantitative approach is more inclined to address the breadth of collected data. As a result, the mixed methods approach provides a more comprehensive understanding of a given phenomenon than an individual approach can offer due to the multi-perspective view of data collected from both approaches. Finally, such a multi-perspective view can assist researchers by highlighting potential complementary and/or contradictory findings that emerge from each individual approach. The complementary findings offer a holistic understanding of the underlying concepts and their relationships that shape a given phenomenon, whereas the contradictory findings can be used to re-evaluate the conceptual foundation and suggest new future research directions.

The combination of qualitative and quantitative studies into a mixed methods approach is not meant to be conducted haphazardly. The findings that emerge from one study should be logically integrated in some way into the other according to the selected research design (Creswell and Tashakkori, 2007). For instance, Johnson and Onwuegbuzie (2004) suggest two dimensions to consider when choosing a mixed methods design: the time order of the qualitative and quantitative studies, and the degree of dominance of each study. Based on these dimensions, the authors have developed a matrix that illustrates nine possible designs as shown in Figure 4.1.

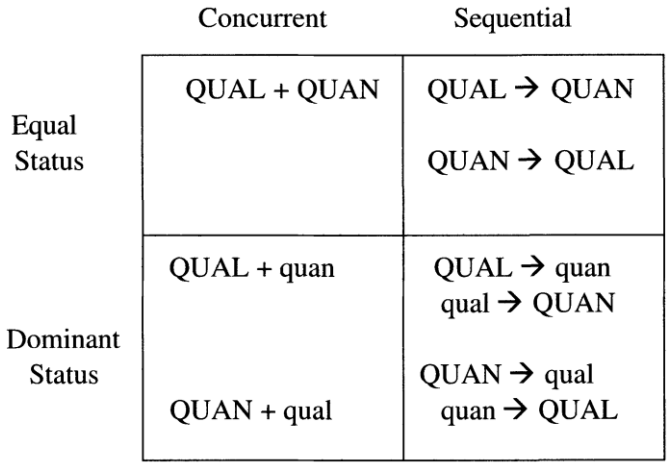

Figure 4.1 Mixed Methods Design Matrix (Johnson and Onwuegbuzie, 2004)

The time order indicates whether the qualitative "qual" and quantitative "quan" studies are conducted concurrently as denoted by the sign "+" or sequentially as denoted by the sign "→". The capital letters used in "QUAL" and "QUAN" denote the dominance of the qualitative and quantitative studies respectively. The dominance refers to whether the qualitative or quantitative study is relatively more important or has a higher priority than the other in terms of size or depth of analysis to achieve the research aim. In equal status designs, researchers emphasise the importance of both studies in investigating the research problem. Information systems researchers suggest that the decision that one study is significantly more important than the other should be based on the research aim and objectives (Venkatesh, Brown and Sullivan, 2016).

A more practical classification of mixed methods designs has been provided by Creswell (2014) based on the following three commonly used research modes:

- **Convergent parallel mixed methods**: this design involves merging data from qualitative and quantitative datasets to provide a comprehensive analysis of the research problem. Both forms of data are typically collected at roughly the same time. The data integration process takes place during the interpretation of the overall results. A practical issue with this design is the need for a team of researchers to concurrently collect qualitative and quantitative data.
- **Explanatory sequential mixed methods**: in this design, the researcher starts with the quantitative research phase with the aim of explaining the obtained results in a subsequent qualitative research phase. An important aspect of this design is to identify the key results of the quantitative phase to be further explored in the qualitative phase.
- **Exploratory sequential mixed methods**: researchers who adopt this design begin with a qualitative research phase that aims to explore the views of participants. The obtained qualitative results can be used to specify the variables that should be included in a follow-up quantitative research phase. They can also be used to develop or identify the instruments that

provide the measurements that best reflect the concept of the specified variables based on appropriate interpretation of the qualitative findings.

Following this review of the different mixed methods designs, it is clear that specifying the logic of the relationship between the datasets of the qualitative and quantitative studies plays a primary role in selecting the appropriate design. Furthermore, the availability of different designs indicates the flexibility of mixed methods approach which enables researchers to choose the design that best suits their research purposes. Given the research aim and objectives discussed in Chapter 1 (section 1.5), the exploratory sequential mixed methods with equal status design (i.e. QUAL → QUAN) was considered as the most appropriate design for the current study for the following reasons:

- **Exploratory and confirmatory purposes**: in the context of technology adoption research, researchers have employed exploratory sequential design to explore the individuals' perceptions of an emerging technology (Venkatesh, *et al.*, 2013). In doing so, they started with an exploratory qualitative study to elicit the factors that participants consider when adopting such technology. A subsequent quantitative study was then conducted to quantify the effect of these factors towards the behavioural intention (e.g. Pavlou and Fygenson, 2006; Kim, Kankanhalli and Lee, 2016; Tu, 2018). In this study, value-added services are considered as a relatively new means of adding value that has not been fully explored in the context of m-payment. Thus, assessing the effect of value-added services requires in the first place an exploration of the components of value and its antecedent factors which consumers consider during the process of deciding whether to adopt m-payment. This would best be achieved by starting with an exploratory qualitative study framed by a preliminary theoretical model that includes such components and factors based on the literature review. The role of theory in this qualitative study was to provide a lens that shapes the data collection (Kaplan and Maxwell, 2005; Hennink, Hutter and Bailey, 2011; Creswell, 2014). In addition, it served as a point of departure that allowed for new factors to emerge as a result of the inductive nature of the qualitative inquiry. In this regard, Morgan (2007) argues that one of the most common applications of the pragmatist paradigm is "to further a process of inquiry that evaluates the results of prior inductions through their ability to predict the workability of future lines of behaviour". By employing this instance of abductive reasoning, as Morgan (2007) describes, the researcher converts observations obtained from qualitative data into theories that can be tested using quantitative data. Therefore, the qualitative phase of this study aimed to explore additional factors (relevant to m-payment adoption) to be included in the theoretical model. Subsequently, the resulting model was assessed in the quantitative phase.
- **Sequential design**: a sequential design was chosen because the findings of one study were used to theoretically inform the subsequent study (Venkatesh, *et al.*, 2013). In the current

study, the purpose of the first qualitative study was to (1) provide a contextual understanding of the factors in the initial proposed model; (2) explore potential new factors; and (3) guide the selection of the measurement items to be used in the subsequent quantitative study.

- **Equal status design**: the decision to consider the qualitative and quantitative studies to be equally important in the current study was based on their significance in addressing the research problem (Venkatesh, *et al.*, 2016). Whilst the qualitative study played an essential role in specifying the factors and selecting the measurement items that best reflect them, the quantitative study evaluated the hypothesised relationships among such factors. Although the effect of value-added services on m-payment adoption was empirically assessed in the quantitative study based on the proposed model and hypotheses, the qualitative study provided the means by which such assessment became feasible. Since each study constituted an integral part of the overall investigation process, both were considered at the same priority level.

Having identified the research paradigm and design, the following two sections will discuss the specific research methods involved in the qualitative and quantitative phases. The research methods represent the different forms of data collection and analysis that this thesis employed in accordance with the selected research design.

4.4 Phase One: Qualitative Research Methods

This section presents the research methods involved in the qualitative phase of this study. It does so by discussing and justifying the choice of the data collection, sampling and analysis methods. In addition, it discusses the strategies used to ensure the validity and reliability of the qualitative findings of this research based on suggestions from qualitative research methodologists.

4.4.1 Data Collection – Interviews

Qualitative data were collected using face-to-face semi-structured individual interviews. Using interviews has been recommended when the aim of study is concerned with understanding participants' perceptions towards a given phenomenon (Creswell, 2007). Since the focus of this qualitative phase is to gain an in-depth understanding of m-payment value as a subjective concept, one-on-one semi-structured interviews were deemed to be suitable for several reasons. First, interviews provide a means to contrast the differences among participants based on their individual experiences and perceptions. Through using open-ended questions, the researcher allows participants to describe their views in their own terms without being restricted to specific response categories (Kaplan and Maxwell, 2005). Second, in order to measure the constructs of the proposed research model in the subsequent quantitative phase, a set of questionnaire items that capture the domain of each construct should be developed (Churchill, 1979). The domain of construct specifies what is included in the construct's definition. Although these constructs have been defined based on the

literature review as discussed in Chapter 3, revisiting these definitions through participants' views provides a contextualised understanding of each construct's domain. Interviews have been suggested as suitable method of generating the measurement items that capture the respective construct domain as perceived by participants (Churchill, 1979; Creswell, 2014). Third, interviews allow the researcher to control the line of questions using a prepared interview guide to prompt data collection (Creswell, 2014). The semi-structured format of the interview maintains a fixed set of questions while allowing the researcher to ask additional questions in response to significant replies and to motivate participants to further elaborate on their answers (Hennink, *et al.*, 2011; Bryman, 2012). Finally, previous m-payment adoption research has demonstrated the suitability of interviews for qualitative data collection in exploratory studies (Mallat, 2007; Chen, Chen and Carpenter, 2018).

An interview guide was designed to include a list of high level topics and questions to prompt data collection. The guide comprised three sections according to the guidelines provided by Hennink, Hutter and Bailey (2011) as follows.

- In the first section, an introduction about the researcher and the purpose of the study was included. After providing information about how data will be handled, interviewee consent was sought to proceed. Opening questions were included in this section to cover the interviewees' demographic information as well as questions related to previous m-payment experience.
- The second section aimed to elicit the interviewees' perceptions of m-payment as a sole service in terms of the theorised constructs included in the proposed research model. For this purpose, the definition of each construct was included followed by open-ended questions to ask interviewees for their perceptions of the presented construct in relation to m-payment. This method allowed the interviewees to define each construct in their own words and contextualise their answers around the use scenarios of m-payment.
- The third section aimed to elicit the interviewees' perceptions in terms of the theorised constructs towards m-payment augmented with each of the three suggested value-added services, namely instant account balance, loyalty card integration, and cashback as discussed in Chapter 3 (section 3.4). The purpose was to highlight any potential contrast of the interviewee's perceptions towards m-payment as a sole and augmented service in terms of the proposed model's constructs. The section concludes with additional questions that asked about how the interviewees rank the proposed value-added services and whether they have suggestions of other value-added services. The aim of these questions was to understand the most important factors that they consider in order to maximise the value of m-payment through value-added services.

The interview guide was initially piloted with two PhD students and their comments were taken into consideration to clarify questions that had not been fully understood. The final interview guide is included in Appendix 4.1.

4.4.2 Sampling

Sampling refers to the process of selecting a portion of the population that represents the whole. The representativeness of the selected sample aims to provide some form of generalisability. According to Onwuegbuzie and Collins (2007), generalisability is interpreted differently based on whether the research approach is qualitative or quantitative. Typically, qualitative studies aim to achieve analytical generalisation using a small sample size whereas quantitative studies draw on a large sample size to achieve statistical generalisation over the whole population. The analytical generalisation of qualitative studies, as Miles and Huberman (1994) discuss, is based on obtaining the sample that best represents the theoretical model. In this regard, the authors explain that sampling in qualitative studies is driven by either a prespecified or emerging theory for which the researcher attempts to generalise the meaning of its underlying constructs and their relationships through a sample of participants. Since the aim of the current study is to investigate the effect of value-added services on m-payment use intention, it is deemed important to obtain a sample of participants who have the means to use m-payment, such as having access to payment cards and smartphones. Furthermore, in order to understand the motivations and inhibitors based on the proposed research model, current adopters and nonadopters should be included in the sample. For this purpose, the selection criteria were set to include participants that (1) are at least 18 years old; (2) own a smartphone; and (3) are residents of the UK as it is the location of this study. The inclusion of adult UK consumers that own a smartphone, regardless of any other demographic characteristics, aimed at maximising the diversity of the sample, thus achieving analytical generalisation of the theoretical model.

A snowball sampling strategy was considered appropriate for the qualitative phase of this study. Snowball sampling involves identifying people who know other people who are ‘information-rich’ (Miles and Huberman, 1994). Thus, the choice of snowball sampling aims to include an initial set of participants that can contribute through their experiences and subsequently through their social networks to advance the researcher’s understanding about the phenomenon of interest (Bryman, 2012). Different channels were used to invite participants, including a university research activity group that includes subscribed staff and students interested in research activities, existing personal contacts, and students. Participants who accepted the interview invitation were asked to refer the invitation to other potential participants who met the above criteria and were interested in the study topic. Along with identifying the method of recruiting participants, specifying the sample size is another issue that needs to be addressed in the sampling process. Although qualitative studies typically have small sample sizes, judging a number of participants is not straightforward (Creswell,

2014). Whilst some researchers suggest that 5-25 individual interviews are sufficient (Creswell, 2007), others set a range of 10-12 interviews (Onwuegbuzie and Collins, 2007). To address this issue, the current study adopted the data saturation principle to judge the adequacy of the sample size. Data saturation is the point at which, in a series of interviews, no new information is emerging (Guest, Bunce and Johnson, 2006). This implies that the sample size cannot be specified beforehand (Bryman, 2012). In addition, data collection and analysis should be conducted concurrently to decide whether the collected data provides enough information to fully explain the theoretical concepts. The data saturation principle is based on the assumptions of grounded theory research which aims to develop new theories inductively from qualitative data (Bryman, 2012). However, grounded theory methodologists assert that this principle can also be utilised when researchers are interested in advancing an existing theory as a starting point to expand its old constructs and develop new ones (Corbin and Anselm, 2015). This applies to the current study, where the proposed theoretical model was used to frame data collection with the aim of further exploring the existing constructs of the model and allowing new ones to emerge through the process. As data collection and analysis were conducted in parallel, sampling continued until data saturation had been reached – till no new insights could be identified during the coding process, which will be discussed in the following subsection. As will be discussed in Chapter 5, the data saturation point was reached after 23 individual interviews.

4.4.3 Qualitative Data Analysis

Data analysis in qualitative research is a process that can generally be organised into three main stages: preparation, coding, and interpretation (Creswell, 2007). Data preparation involves recording collected data from interviews into a manageable database. In this study, all interviews were audiotaped and transcribed verbatim into text files. Each file was then imported into NVivo (www.qsrinternational.com) software (version 11), which facilitates qualitative data analysis. NVivo maintains the imported interviews in a database that allows the researcher to analyse the contents of the individual interviews and establish links among them through coding. Coding is the process of labelling a segment of text under a code that reflects a summative meaning of that segment (Saldaña, 2009). The purpose of coding is twofold: (1) to identify issues raised in the data and understand the way participants attach meanings to such issues; and (2) to index data so that references to specific issues discussed across all participants can be retrieved easily (Hennink, *et al.*, 2011). Codes can generally be classified into deductive and inductive codes (Miles and Huberman, 1994; Hennink, *et al.*, 2011). Deductive codes originate from the researcher based on a conceptual framework drawn from the research literature. Inductive codes are developed from reading the transcripts, where participants raise issues that may be different from those initially anticipated by the researcher. In this study, a set of deductive codes that correspond to the proposed model's constructs were created initially. Participants' descriptions of a given construct were coded under these initial descriptive

codes. Furthermore, details or specific dimensions that the participants attached to a given construct were coded with a new sub-code under that construct's parent code (Miles and Huberman, 1994; Saldaña, 2009). These sub-codes reflect the construct's domain as perceived by participants. Codes that could not fit under an existing parent code were grouped under a new inductive parent code. The final interpretation stage of data analysis involved developing descriptions about participants' experiences by discussing quotes that capture the essence of m-payment adoption from their perspective. This process was facilitated by the identified codes which highlight significant statements made by participants when expressing their experiences of and beliefs about m-payment.

4.4.4 Validity and Reliability

Using validity and reliability strategies is essential to ensure research rigor (Creswell and Miller, 2000; Morse, 2015). Addressing validity and reliability issues in qualitative research has been described as "ambiguous and contentious" as compared to quantitative research (Venkatesh, *et al.*, 2013). Whilst quantitative research relies on standard statistical procedures to account for the validity and reliability of quantitative measurement items, qualitative researchers have followed various strategies based on different perspectives. For instance, some researchers have proposed qualitative equivalents that parallel the concepts of validity and reliability in quantitative approaches with minor changes to the meaning (Bryman, 2012). Others have suggested quite different criteria and terms tailored for qualitative research, such as trustworthiness and authenticity (Bryman, 2012). Another approach, which was adopted in this study, suggests keeping the mainstream terminology of social science for validity and reliability and apply their respective strategies as an integral part of the data collection and analysis process (Creswell, 2007; Morse, 2015).

Validity has been generally defined as the "degree to which inferences made in a study are accurate and well-founded" (Polit and Beck, 2012, cited in Morse, 2015). In qualitative research, validity reflects how well the phenomenon of interest is represented in terms of whether the produced descriptions capture its essence in a way that can be recognised by others (Morse, 2015). Various strategies have been suggested to achieve validity in qualitative research, including among others prolonged engagement and observation of participants, rich descriptions, triangulation, peer debriefing, and external audits (Creswell and Miller, 2000; Morse, 2015). According to Creswell (2007), qualitative researchers should engage in at least two of these strategies to validate their research findings. Given the time and resource limitations of this study, rich descriptions and triangulation were chosen as suitable validation strategies to apply in the qualitative phase as follows:

- **Rich descriptions** involve providing a detailed description about the participants and their perceptions of the themes of study (Creswell and Miller, 2000; Morse, 2015). Basically, rich descriptions allow researchers to support the validity of their qualitative findings from two aspects. First, providing a rich description of the theorised constructs from the perspective

of participants allows the researcher to support theory development by evidence from data (Kaplan and Maxwell, 2005). In this regard, Morse (2015) highlights the importance of the sample size in terms of its appropriateness to provide the required rich descriptions that saturate the theory under investigation. As discussed in section 4.4.2, this was taken into consideration through the data saturation principle which determines whether the collected data is enough for the theory under consideration, i.e. the sample size. Second, rich descriptions allow the readers to make judgements about the transferability of the findings to other contexts (Creswell, 2007; Bryman, 2012). In the qualitative phase of this study, rich descriptions will be provided in Chapter 5 to include information about the recruited participants and a discussion of their views based on selected quotes from the verbatim transcripts of interviews.

- **Triangulation** refers to using different sources of data or data collection methods in a single research inquiry to enhance validity (Creswell and Miller, 2000; Kaplan and Maxwell, 2005; Morse, 2015). Triangulation offers greater credibility of research by allowing researchers to spot congruences and/or discrepancies in the findings that emerge from the different data collection methods and sources (Kaplan and Maxwell, 2005). Since this study employs a mixed methods approach, triangulation is supported by design. The findings of both the qualitative and quantitative phases will be compared to support the validity of inferences obtained from both methods.

Along with validity, reliability is another measure to achieve research rigor. Reliability is defined as the ability of obtaining the same results if the study is to be repeated (Morse, 2015). In this regard, Kaplan and Maxwell (2005) explain that qualitative research is subjective by nature as the researcher represents the instrument of data collection and analysis. Thus, different researchers may produce different interpretations for the same research problem. However, the authors contend that reliability in qualitative research is achieved through following strong validation strategies that allow researchers to pay close attention to meaning, context, and process of inquiry. Morse (2015) also supports this approach by explaining that validation strategies contribute to research reliability. For example, rich descriptions allow the researcher to highlight repetition in data patterns across participants, thus emphasising reliability. This is also achieved through triangulation by confirming the findings obtained from one data source with those of the other source.

Other researchers suggest that reliability can be enhanced through clear and well-defined methodological procedures. For instance, Creswell (2007) argues that using good quality recording along with accurate transcription that captures all pauses and overlaps in the interviews can enhance reliability. This is in line with the data collection procedure followed in this study as described in subsection 4.4.1. Another strategy has been suggested by Morse (2015) through developing a well-defined coding system. This strategy, which is particularly relevant for semi-structured interviews,

involves the development of all possible codes that label the participants' responses to the questions of the interview guide that maintains a fixed format across all participants. Although participants are free to provide the answers they wish, such answers will be easier to code under the predefined code's stem. This allows the researcher to systematically code the responses under a restricted theme. This strategy is convergent with the data analysis method employed in this study as described in subsection 4.4.3. Data analysis is preceded with an initial set of codes which corresponds to the theorised constructs of the research model. Participants' responses were systematically coded under this initial set; thus, the coding strategy contributes to reliability by restricting each newly developed code under a predefined parent code. Another strategy is to employ an intercoder agreement to analyse the transcripts, where the researcher along with another analyst develop two individual sets of codes for the same transcript. Both sets are then compared for code agreements to demonstrate the stability of the final set. However, this strategy comes with the challenge of employing additional research resources, which is a limitation of this study. Therefore, the qualitative phase of this study achieves reliability through a combination of: (1) validation strategies, i.e. rich descriptions and triangulation; and (2) well-defined methodological procedures for recording, transcribing, and coding.

4.5 Phase Two: Quantitative Research Methods

In this section, the research methods involved in the quantitative phase of this study are discussed and justified as appropriate to address the research objectives. The methods discussed cover data collection, sampling technique, sample size calculation and data analysis. Finally, the measures taken to ensure the validity and reliability of the quantitative approach are described.

4.5.1 Data Collection – Survey Experiment

A survey experiment was designed to collect data for the quantitative phase of this study. As a data collection method, surveys are typically used to collect quantitative data about feelings, beliefs, opinions, and behaviours in a population by studying a sample of that population. (Fink, 2017). The purpose is to generalise the results from the study sample to the entire population (Fowler, 2009). Quantitative data collection can be designed to be either nonexperimental or experimental (Creswell, 2014). Nonexperimental designs are often associated with observational or correlational studies, whereby researchers are interested to observe the magnitude and direction of relationships among a set of variables (Shadish, Cook and Campbell, 2002). Experimental designs allow researchers to evaluate the impact of a specific intervention on outcomes of interest by providing that intervention to one or more experimental groups of participants and withholding it from another control group (Bryman, 2012; Creswell, 2014). The intervention involves manipulating an independent variable to assess whether it has an effect on one or more dependent variable by comparing the difference in experiences between the experimental and control groups (Bryman, 2012). An experimental design

using a survey data collection and sampling method was chosen for the quantitative phase of this study for three main reasons:

- **Establishing causal inferences**: survey experiments have been described as the "gold standard" for establishing causal relationships (Mutz, 2011). In this regard, Mutz (2011) explains that in order for an independent variable to be considered as a cause of a dependent variable, three criteria must generally be met: (1) the two variables must co-vary; (2) the cause must precede the effect in time; and (3) the relationship between the cause and effect must not be explainable by a third (confounding) variable – nuisance variable as termed by Keppel and Wickens (2004). Whilst observational research includes strategies that address the first two criteria, experimental research provides the best approach to address the issue of the third variable (Mutz, 2011). Keppel and Wickens (2004) explain that the effect of the nuisance variable can be eliminated through a combination of strategies, such as conducting data collection at the same time using the same data collection instrument and randomisation. Randomisation means that each participant has an equal chance to be assigned to any group. This ensures that any difference between experimental and control groups is not systematically related either to participants' characteristics or to the interventions received (Keppel and Wickens, 2004). The main aim of this study is to assess whether offering a value-added service (the independent variable) would have an influence on m-payment use intention (the dependent variable). It is thus of importance to ensure that such an influence is caused by the independent variable and not by any other nuisance variable.
- **Popularity of the survey method**: as a data collection method, surveys have been found to be the most commonly used method in technology adoption research (Williams, *et al.*, 2009) and in information systems research in general (Palvia, *et al.*, 2015). In the context of m-payment adoption research, a systematic literature review conducted by Dahlberg *et al.* (2015) reveals that over 90% of studies (31 out of 34) have collected data using survey questionnaires. In particular, survey experiments have been employed by many technology adoption researchers to collect quantitative data for theory and hypothesis testing. For instance, de Ruyter, Wetzels and Kleijnen (2001) investigated consumer adoption of e-services through an experiment that manipulates different levels of organisational reputation, relative advantage, and perceived risk. Another study by Gupta *et al.* (2017) explored the effect of manipulating three levels of security on perceived risk, perceived control, and adoption of mobile banking. In a similar approach, Zhao *et al.* (2019) studied the impact of manipulating two types of financial incentives on perceived risk, perceived ease of use, perceived usefulness, and the intention to adopt m-payment.
- **Convenience of online surveys to conduct randomised experiments**: survey experiments allow researchers to conduct experiments outside a laboratory setting and in more

generalisable circumstances. This eliminates the physical and temporal limitations of arranging face to face experiments (Mutz, 2011). Furthermore, by gaining access to large and diverse survey participant pools, researchers can address critical behavioural phenomena more effectively and efficiently by using survey experiments (Mutz, 2011).

Planning an experiment requires careful consideration of four experimental components, namely variables, sampling, experimental design, and measures (Keppel and Wickens, 2004; Creswell, 2014). The following subsections discuss these components in detail and how they were considered in the context of this study.

4.5.2 Experimental Design Variables

The basic intent in conducting experiments is to measure the effects of manipulating an independent variable on a dependent variable as an outcome of interest. Researchers need to specify these variables in order to clarify the experimental interventions that the groups will receive and the outcomes that will be measured (Creswell, 2014). The independent variable of this study is the value-added service whereas there are two dependent variables as specified in the (initial) proposed research model, namely trust in provider and perceived value. It should be noted that the effect of the value-added service on m-payment use intention is theorised to be mediated by perceived value as a sole predictor. The mediation effect will be discussed and analysed in Chapter 6. Since the value-added service variable will reflect different instances of additional services, it is considered as an independent categorical variable (Keppel and Wickens, 2004). Thus, each experimental group will be compared against the control group based on presence/non-presence of the intervention condition, i.e. the value-added service is present only in experimental groups. Furthermore, as there are two dependent variables, a multivariate data analysis method will be needed to analyse the simultaneous effect of each intervention condition on such variables (Keppel and Wickens, 2004). The data analysis method will be discussed in subsection 4.5.7.

4.5.3 Sampling Technique

Sampling can be classified into two main types: probability and nonprobability sampling (Saunders, Lewis and Thornhill, 2019). In probability sampling, also termed as random sampling, each unit of the target population has an equal probability of being selected from a pre-established sample frame (Bryman, 2012; Creswell, 2014). The sample frame is a complete list of all possible cases in the target population (Saunders, *et al.*, 2019). The main advantage of probability sampling is that researchers can generalise their findings to the entire target population based on the randomly selected sample. However, a key challenge in probability sampling is the availability of an up to date reliable sample frame that accurately includes all units of the target population (Saunders, *et al.*, 2019). Other challenges that researchers need to account for when using random sampling include

time and cost of collecting the required sample size and the possibility of having a high non-response rate (Bryman, 2012).

The other type of sampling is nonprobability or convenience sampling, which involves the selection of respondents based on their convenience and availability rather than on a random selection method (Bryman, 2012; Creswell, 2014). A known limitation of convenience sampling is that the probability of selecting a unit of the population is unknown. Thus, any generalisations about specific characteristics of the target population cannot be based on statistical inference. However, evidence from previous research that has employed survey experiments suggests that convenience samples provide comparable estimates of causal effects to those obtained from probability samples (Mullinix, *et al.*, 2015; Coppock, 2019). Since the aim of this study is to explore the causal effect of value-added services on m-payment adoption, a nonprobability convenience sampling technique was employed to obtain quantitative data. This is congruent with previous m-payment adoption studies that used convenience sampling techniques for quantitative data collection (e.g. Slade, Williams, *et al.*, 2015; Johnson *et al.*, 2018; Zhao *et al.*, 2019).

To maintain consistency of sampling across the qualitative and quantitative phases of this study, the same selection criteria outlined in section 4.4.2 have been used to recruit participants from the UK adult population through Prolific, a crowdsourcing platform based in the UK (www.prolific.co). Crowdsourcing platforms have become an appealing alternative to other traditional convenience sampling techniques, such as student pools and laboratory experiments (Palan and Schitter, 2018). They offer several advantages to survey and experimental research, including reduced costs of recruitment and experimental setup, participant diversity, and high data quality attained through incentives offered to participants based on their adherence to study instructions (Goodman and Paolacci, 2017). As compared to other popular crowdsourcing platforms, Prolific has been found to offer higher data quality for online experiments (Peer, *et al.*, 2017) with more diverse and honest participants (Palan and Schitter, 2018).

Despite the above suggested advantages of crowdsourcing platforms, recruiting participants through online subject pools comes with a limited control over the participants' actual geographical location. Since the focus of this study is on UK consumers, three measures were employed to mitigate this limitation. First, the study was only visible to participants who were registered as UK residents on Prolific platform. This feature was provided by the platform to enable researchers to restrict access to their studies based on place of residence of the participants. Second, the study advertisement on Prolific was designed to explicitly inform the participants that they should only take part if they were residents of the UK. Finally, the conditions that should be met by the participants to take part were clearly stated in the participant information sheet, which was part of the survey. Another limitation is related to the fact that respondents were paid for their participation, which may have introduced

the risk of self-selection bias. Overly high pay rates are known to be more attractive to participants (Goodman and Paolacci, 2017). To account for this risk, the pay rate for this study was set in line with the fair minimum amount as recommended by Prolific. In addition, in accordance with Prolific terms and conditions, participants were aware that compensations would only be offered to those who exhibit sufficient attention to the survey questionnaire (more details are provided in Chapter 6).

4.5.4 Sample Size

Required sample size was determined based on the minimum sample size required for the method of statistical analysis employed. Since this study includes multiple dependent variables, structural equation modelling was chosen as a multivariate data analysis technique (Hair, *et al.*, 2014). In this technique, researchers recommend the use of statistical power analysis to calculate the required sample size (Cohen, 1992; Hair, *et al.*, 2017). More specifically, using statistical power analysis in the context of experimental design allows researchers to specify the sample size that offers the highest sensitivity to the effect of the experimental manipulation across all groups (Creswell, 2014). Statistical power refers to the probability of rejecting a false null hypothesis (Cohen, 1992). To determine the minimum sample size using statistical power analysis, the following values should be specified (Hair, *et al.*, 2017):

- Level of statistical power,
- Significance level, which reflects the probability of error (p-value of 0.01, 0.05, or 0.1),
- Minimum value of the coefficient of determination (R^2) to be detected (0.10, 0.25, 0.50 or 0.75),
- The maximum number of arrows pointing at a construct in the measurement and structural models

The current study follows the commonly used level of statistical power of 0.80 and a significance level of 0.05 (Cohen, 1992; Hair, *et al.*, 2017) to detect a minimum value of 0.10 for R^2. According to the initial proposed model depicted in Figure 3.1, the maximum number of arrows is seven, pointing at the perceived value construct. Having specified the required values, the sample size needed for each group can be obtained either by using power analysis lookup tables or calculated through power analysis software programs, such as G*Power (Faul, *et al.*, 2009). According to the lookup table provided by Hair *et al.* (2017), the minimum sample size for each group should be 137, which was also the calculation result obtained from G*Power (release 3.1.9.4). Given the initial number of three value-added services, the total minimum sample size for the control and the three experimental groups is 137*4=548.

4.5.5 Experimental Design Considerations

Undertaking experimental research involves specifying the experiment type and experimental design. Experiments have been broadly classified into two main types: true randomised experiments

and quasi-experiments. A randomised experiment involves random assignment of participants to two or more groups that are probabilistically similar on average (Shadish, *et al.*, 2002). Randomised experiments are typically used when researchers wish to observe the difference caused by manipulating an independent variable to one or more dependent variables. Thus, randomisation allows researchers to assume that any such difference is likely to reflect the effect of the manipulated independent variable, not the differences between the groups (Shadish, *et al.*, 2002; Bryman, 2012). Quasi-experiments lack random assignment, where participants are assigned to groups based on self-selection, researcher's selection, or any other natural classification criterion such as gender (Shadish, *et al.*, 2002; Keppel and Wickens, 2004). In quasi-experiments, the differences observed in the dependent variable(s) cannot be confidently attributed to the manipulated independent variable due to the potential differences of between-groups characteristics (Keppel and Wickens, 2004). In the context of this study, the aim of the experiment is to provide solid inferences about the hypothetical effects of value-added services on the factors that influence m-payment use intention. Therefore, a randomised experiment was chosen as an appropriate approach to identify such effects by controlling for between-group differences through random assignment.

Along with the experiment type, researchers need to specify the experimental design that will be followed to measure the intervention effects. In randomised experiments, there are three possible designs: pretest-posttest control group, posttest-only control group, and Solomon four-group (Campbell and Stanley, 1963; Creswell, 2014). In pretest-posttest control group design, participants are randomly assigned to two groups, the intervention is provided to one group (experimental group), and the effects of such intervention are measured for both groups before and after the time period in which the experimental group receives the intervention. The posttest-only control group design follows the same procedure except that measurements are taken for both groups after intervention has been provided for the experimental group. Finally, the Solomon four-group design is a 2 x 2 factorial design which involves random assignment of participants to four groups, a variation of pretests and interventions across the four groups, and a posttest for all groups. Campbell and Stanley (1963) developed a standard notation for these designs as illustrated in Figure 4.1, which is still recommended for current experimental research (Creswell, 2014).

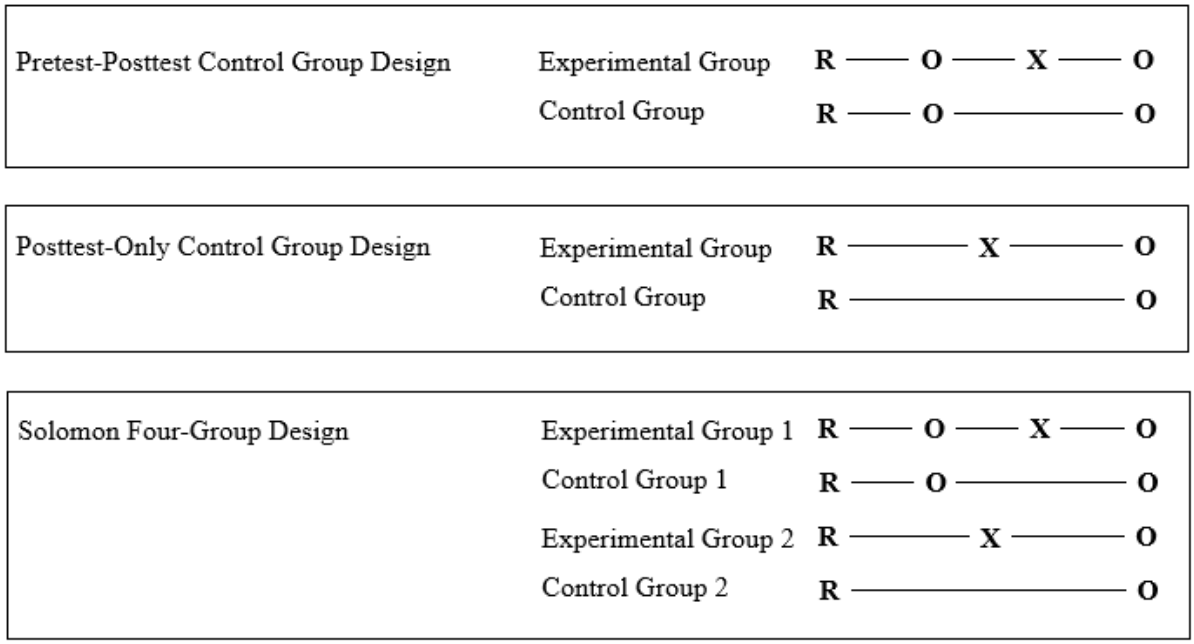

Figure 4.2 Randomised Experimental Designs (Campbell and Stanley, 1963; Creswell, 2014)

The letter 'R' shown in the figure denotes a randomisation procedure, 'O' denotes observation or measurement, and 'X' denotes exposure to an experimental variable (intervention). By comparing the three designs, Campbell and Stanley (1963) illustrated that posttest-only control group and Solomon four-group designs offer a level of validity superior to that associated with the pretest-posttest control group design. In the current study, the posttest-only control group design was chosen for several reasons. First, the posttest-only control group has been cited as a popular experimental design (Creswell, 2014). Second, a posttest-only design avoids requiring participants to answer the same set of measurement items as in the case of pretest-posttest design. Repeating the measurement items increases the survey length, which is likely to cause fatigue and decrease response rates (Hair, *et al.*, 2017). Finally, the Solomon four-group design involves recruiting two additional groups for each intervention condition, thus a larger sample size is required to attain the same level of validity as that of the posttest-only design.

The survey experiment was designed such that participants were randomly assigned to different groups that include one control group and an experimental group for each of the proposed value-added services. This is a between-subjects design; meaning that participants are exposed to only one of the different intervention conditions and each experimental group is compared with the control (baseline) group in which the intervention is absent (Keppel and Wickens, 2004). An alternative experimental design is a within-subject design, in which each participant is exposed to the baseline condition and each of the intervention conditions (Keppel and Wickens, 2004). While a within-subject design requires a smaller sample size and offers a better comparability of groups as compared to a between-subjects design, it comes with two limitations. First, the order in which the conditions

are tested would introduce a nuisance variable that is not present in a between-subjects design (Keppel and Wickens, 2004). Second, the smaller sample size comes at the expense of the survey length since each participant would have to answer the same set of measurement items for each condition. On the other hand, the main disadvantage of a between-subjects design is the requirement of a large sample size to cover each condition (Keppel and Wickens, 2004). Since this was adequately addressed through statistical power analysis and the use of a crowdsourcing platform to recruit the participants, a between-subjects design was chosen for this study.

The survey experiment included the following four sections:

- The first section included the participant information sheet, which provides information about the aim of the study along with a description of the data collection procedure.
- In the second section, the experimental manipulation was conducted using image and textual information stimuli to describe a m-payment app. The use of textual stimuli in online experiments has been employed by many consumer and information systems studies as a means to illustrate real experiences (e.g. de Ruyter, Wetzels and Kleijnen, 2001; Fleischmann *et al.*, 2015; Zhao *et al.*, 2019; Karimi and Liu, 2020). In the control group, participants were exposed to an image and text that illustrate the functionality of the current m-payment apps, i.e. without value-added services. For each of the experimental groups, the same stimuli were used with an additional text provided to describe the functionality of one of the suggested value-added services that might be integrated in future m-payment apps. This means that the participants of the experimental groups are exposed to the same stimuli provided to the participants of the control group along with the additional description of a value-added service. Exposing participants of the experimental groups to both the core service of m-payment and the value-added service aims to avoid the issue of contextual differences associated with between-subjects design. In this regard, researchers have demonstrated that between-subjects designs may introduce invalid inferences due to different stimuli contexts on which participants base their responses (Birnbaum, 1999). Thus, the aim was to maintain a consistent context across all groups so that the causal effect of value-added services is isolated based on their relationship to m-payment as a core service, which was described to all participants.
- In the third section, participants were asked to answer a set of survey items that measure their perceptions of the proposed model's constructs. This was based on the assumption that they have access to the described m-payment app in the stimulus text. The same set of measurement items was used across all groups. The online survey platform SurveyMonkey (www.surveymonkey.co.uk) was used to create, organise the survey items, and execute the randomisation procedure that the platform provides. The recruitment process started by publishing the study information and the survey link on Prolific. Interested participants who

agreed to participate were then redirected to SurveyMonkey to complete and submit the survey.

- Demographic variables of age, gender, occupation, and highest level of education along with past m-payment experience were obtained in the fourth and last section of the survey.

Figure 4.3 provides a visual representation of the survey experiment procedure, where 'n' represents the total number of the proposed value-added services. Initially, three value-added services were proposed based on literature suggestions as discussed in section 3.4. An additional value-added service was included in the survey based on participants' suggestions in the qualitative study, as will be discussed in Chapter 5.

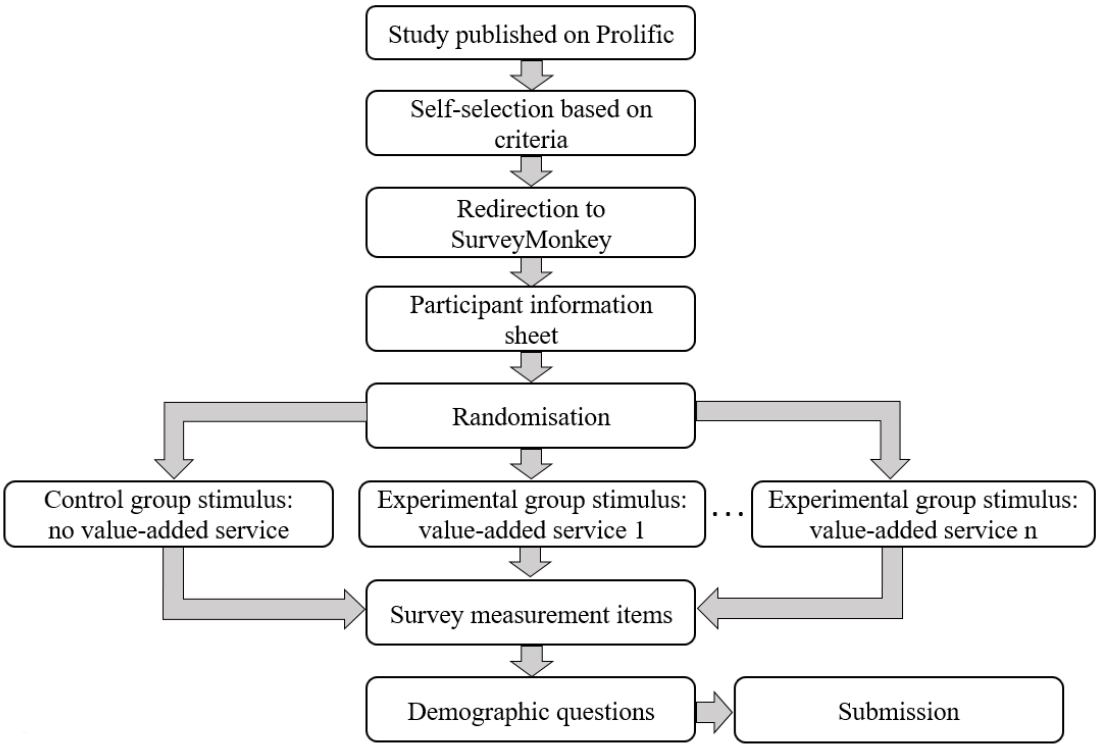

Figure 4.3 Survey Experiment Procedure

4.5.6 Measures

Survey measurement items were adapted from previous studies based on the participants' interpretations of the hypothesised constructs in the qualitative study. This will be discussed in detail in Chapter 5. Following previous research, a seven-point Likert scale with anchors ranging from 1 (Strongly disagree) to 7 (Strongly agree) was used for all constructs. Demographic variables were measured using close-ended questions whereas past m-payment experience was measured using a seven-point frequency scale, ranging from never to several times a day, adapted from Venkatesh et al. (2012). The resulting survey was then reviewed by doctoral candidates and faculty members, and their comments on structure and wording were taken into consideration to rephrase problematic

items. The survey was further tested with a convenience sample of 62 participants recruited through Prolific in order to test the randomisation procedure and confirm the clarity of communication. Participants were informed that the study was being piloted and were asked to provide their feedback regarding the clarity of the survey items. Following a careful consideration of their feedback, minor changes were made to the wording of some of the items. The final version of the survey is included in Appendix 4.2.

4.5.7 Quantitative Data Analysis

As mentioned earlier, structural equation modelling (SEM) was chosen for data analysis because the research model includes multiple relationships of dependent and independent variables. Structural equation modelling is a multivariate analysis that applies statistical methods to simultaneously examine dependence relationships among multiple variables (Hair, *et al.*, 2014). There are two main methods of SEM, namely covariance-based SEM (CB-SEM) and variance-based partial least squares SEM (PLS-SEM) (Hair, *et al.*, 2017; Matthews, Hair and Matthews, 2018). Although both methods belong to the same class of statistical models that employ structural equation modelling of unobservable variables and measurement error, they differ in terms of characteristics and objectives (Ali, *et al.*, 2018). CB-SEM is primarily used to confirm or reject theories by determining how well a proposed model can estimate the covariance matrix for a sample of data (Hair, *et al.*, 2017). In contrast, PLS-SEM is typically used to develop theories in exploratory research by focusing on explaining the variance in the dependent variables of the proposed model (Hair, *et al.*, 2017). PLS-SEM was chosen as a suitable statistical analysis method that fits the aim and objectives of this study for the following reasons:

- **Exploratory research**: PLS-SEM is considered more appropriate when the research objective is exploratory in nature. This is due to the high statistical power of PLS-SEM compared to CB-SEM as evidenced by previous research (Sarstedt, Ringle and Hair, 2017). The high statistical power allows researchers to better understand extensions of established theories, particularly when such extensions have not been clearly defined by existing literature (Hair, *et al.*, 2017). By focusing on explaining the variance in the dependent variables, PLS-SEM examines which independent variables significantly predict the dependent variables of interest (Hair, *et al.*, 2017). Furthermore, PLS-SEM has been classified as a causal-predictive approach to SEM, which makes it particularly suitable for models designed to provide causal explanations (Hair, *et al.*, 2019). Since this study aims to explore the causal effect of value-added services on m-payment use intention, the use of PLS-SEM is justified because of its exploratory and predictive approach.
- **Presence of formative higher order constructs**: it has been recommended that PLS-SEM should be used when the structural model includes one or more formatively measured constructs (Chin, 2010; Lowry and Gaskin, 2014; Ringle, *et al.*, 2018; Hair, *et al.*, 2019).

Handling formative constructs is easier with PLS-SEM as compared to CB-SEM, which requires additional modification to construct specification (Hair, *et al.*, 2017). Furthermore, Chin (2010) explains that whilst CB-SEM can only handle reflective higher order constructs, PLS-SEM is able to model both reflective and formative higher order constructs. As discussed in Section 3.2, the proposed research model includes perceived value as a higher order formative construct, which further justifies the choice of PLS-SEM.

- **High model complexity**: the structural model is complex when it includes many constructs, indicators (measurement items), and model relationships. The PLS-SEM method can handle higher model complexities with fewer restrictions in terms of sample size and data normality as compared to CB-SEM (Ringle, Sarstedt and Straub, 2012; Hair, *et al.*, 2019). In this regard, a review of information systems empirical studies employing PLS-SEM between 1992 and 2011 has found that research models included an average of 8.12 latent variables, 27.42 indicators (measurement items), and 11.38 structural relationships (Ringle, *et al.*, 2012). As will be discussed in the next chapter, the extended research model of this study has a total of 9 latent variables (first order constructs), 35 indicators, and 6 structural relationships. The specification of the second order construct (perceived value) involves an additional 20 structural paths (see Chapter 6). Therefore, the research model of this study exhibits a higher complexity than the average complexity of research models of previous studies that employed the PLS-SEM method.
- **Experimental design**: although both CB-SEM and PLS-SEM can be used to analyse experimental data, CB-SEM may not be used to handle complex models as opposed to PLS-SEM (Bagozzi, Yi and Singh, 1991; Streukens, *et al.*, 2010). Furthermore, PLS-SEM allows for an experimental categorical variable that has two levels (i.e. dichotomous) to be directly included as a construct in the structural model as an exogenous (independent) variable (Henseler, Hubona and Ray, 2016; Hair, *et al.*, 2017). This can be done by modelling an experimental manipulation as a latent variable (construct) with a dummy coded (0/1) variable as its formative indicator, whereby zero represents the control group (Streukens, *et al.*, 2010; Hair, *et al.*, 2017). As discussed in subsection 4.5.2, the experimental independent variable (value-added service) is classified as a categorical variable that indicates the presence of an instance of the proposed value-added services. Thus, PLS-SEM was chosen as it allows for the representation of a value-added service as a categorical variable in the structural model.

PLS-SEM analysis is a two-step process: (1) measurement model assessment, which aims to examine the validity and reliability of the measurement items; and (2) structural model assessment, which evaluates the magnitude and significance of the relationships among the model's constructs as well as its predictive power (Chin, 1998; Hair, *et al.*, 2017). These steps will be discussed in detail in Chapter 6. Data analysis was performed using the software package SmartPLS (version 3.2.8)

(Ringle, Wende and Becker, 2015). SmartPLS provides a graphical user interface that allows researchers to develop and analyse structural models using PLS-SEM. For the purpose of analysing the survey experiment of this study, SmartPLS was installed on a Windows 10 machine with 8 GB of memory and a 3 GHz Intel Core i7 CPU.

4.5.8 Validity of Experimental Design

In order to ensure the credibility of inferences drawn from experimental research, researchers need to account for potential threats to the validity of their experiments by taking measures to avoid or minimise the effect of such threats. There are two types of validity in experimental research: internal and external validity (Creswell, 2012; Sekaran and Bougie, 2016). Internal validity refers to the degree of confidence in the inferences drawn from the purported causal effect of the independent variable on the dependent variables. Threats to internal validity stem from potential variations in experimental procedures, interventions, or participants' experiences of the different groups (Creswell, 2012). In this regard, Keppel and Wickens (2004) argue that the main goal of conducting experiments is to keep all experimental conditions identical across all groups except for the manipulations being studied. One way of achieving this goal, as Keppel and Wickens (2004) explain, is through random assignment, which was adopted by this study to achieve comparability of groups. Since randomised experiments have long been known for their inherent internal validity (Campbell and Stanley, 1963; Bryman, 2012; Creswell, 2012), threats to internal validity in this study are controlled by random assignment.

External validity refers to the degree to which the causal effect of the independent variable on the dependent variables can be generalised to other persons, settings, treatment variables, and measures (Creswell, 2012). Threats to external validity arise when researchers incorrectly draw inferences from the experiment to other persons or settings while ignoring the specific characteristics of the sample, the uniqueness of the experimental settings, or the timing of the experiment (Creswell, 2014). The tightly controlled nature of experimental research restricts the generalisability of results. This implies a trade-off relationship between internal validity and external validity, meaning that a high internal validity is typically achieved at the expense of external validity (Aguinis and Bradley, 2014; Sekaran and Bougie, 2016). In order to increase the external validity of one experiment, additional experiments need to be conducted with different sample characteristics, additional experimental settings, and at different points of time (Creswell, 2014; Sekaran and Bougie, 2016). However, initial exploratory experiments can be used to draw inferences about the presence or non-presence of a causal relationship under a well-specified experimental setup. Such inferences provide a guideline for future experiments in wider contexts (Sekaran and Bougie, 2016). Given the time and resource limitations, this study aims to provide an exploratory investigation of the feasibility of integrating value-added services as a means to promote m-payment adoption. Nevertheless, external validity has been taken into consideration through two measures. First, the sample was obtained from a

crowdsourcing platform. As discussed earlier, this has provided a better representation of the target population as compared to laboratory experiments. Second, the details of experimental settings have been made clear so that any inferential findings can be interpreted in terms of such settings.

4.6 Research Ethics

The methods employed by this study for data collection and handling were in line with the regulations set by Oxford Brookes University Research Ethics Committee. Full approval from the University Research Ethics Committee was obtained for the above described methods prior to any data collection. Both data collection phases involved providing participants with a 'Participant Information Sheet' that included information about the study and the researcher, how data would be collected and handled and the expected duration of participation. The sheet also highlighted that participation was completely voluntary and participants could withdraw from the study at any point if required. After reading the information sheet, participants were asked to provide their consent to participate either by signing a consent form, or electronically. To protect the identity of participants, no identifying information was collected. Participants recruited through Prolific were compensated for their time in accordance with the fair minimum cash amount set by the platform.

4.7 Summary

Given the complex and challenging nature of the research problem addressed in this thesis, it is not feasible to use a single methodology. This thesis therefore adopts various research methodologies to design, develop and evaluate the proposed solution. Based on review and critical analysis of a number of existing methodologies, this chapter has provided an analysis and justification for the methodologies chosen. Table 4.1 provides a summary of the methodological choices that have been adopted.

Table 4.1 Summary of the Methodological Choices

Research paradigm	Pragmatist	
Research design	Exploratory sequential mixed methods	
Approach	Qualitative	Quantitative
Data collection method	Individual interviews	Survey experiment using a between-subjects posttest-only with control group design
Sampling technique	Convenience snowball sampling	Convenience sampling using a crowdsourcing platform

Sample size specification method	Data saturation	Statistical power analysis
Data analysis method	Content analysis using a coding system	Partial least squares structural equation modelling (PLS-SEM)
Validity measures	Rich descriptions, triangulation, and a well-documented data collection and analysis procedure	Internal validity: random assignment External validity: obtaining a diverse sample and providing well-described experimental setup

Following a detailed review of the different research paradigms, the pragmatist paradigm was chosen for this study as it focuses on solving the research problem without imposing restrictions on the methodologies used. Employing methodologies that were traditionally classified under different research paradigms is important for this study as it requires qualitative and quantitative investigations to achieve the research aim and objectives. An exploratory sequential mixed methods design was chosen as it starts with an exploratory qualitative study followed by a confirmatory quantitative study. The qualitative investigation aims to develop and enhance a conceptual model through providing an in-depth understanding of the highly subjective concept of value and its relationship with value-added services and other influential factors in the m-payment context. For this purpose, a snowball sampling technique was chosen to invite participants for individual interviews to collect qualitative data. The data analysis, which involved recording, transcribing, and interpreting data using a predefined coding scheme, was used to determine the required sample size based on the data saturation principle. Considerations of validity were addressed through rich descriptions and triangulation, which have also been used to achieve reliability along with well-documented methodological procedures. The outcome of the qualitative investigation achieves the first and second research objectives.

The quantitative investigation builds upon the findings obtained qualitatively to test the theorised causal effect of value-added services on the factors that predict m-payment adoption intention. To isolate the causal effect of value-added services, a crowdsourcing platform was used to invite participants to take part in a randomised survey experiment using a between-subjects posttest-only design for quantitative data collection. The statistical power analysis method was chosen to specify adequate sample size and PLS-SEM was found to be the most appropriate technique for evaluating the proposed model and testing the research hypotheses. The internal validity of the experimental

design was secured by random assignment. External validity was enhanced through increasing the representativeness of the sample and providing a detailed description of the experimental setup. The outcome of the quantitative investigation achieves the third research objective. Both the qualitative and quantitative investigations provide the foundations to establish the research implications and suggest future research directions, which represent the fourth and last research objective. Considerations of ethics that pertain to the methodologies employed throughout the two phases of this study were approved by Oxford Brookes University Research Ethics Committee.

Chapter 5 Qualitative Data Analysis and Extended Research Model

5.1 Overview

This chapter presents a detailed analysis of the qualitative data collected from the semi-structured interviews. The data analysis is focused on providing contextualised rich descriptions of both the initially proposed and newly emergent factors that influence the intention to use m-payment as perceived by the participants. Furthermore, the chapter discusses how the participants perceived the added value of introducing value-added services along with the core m-payment service. The inferences drawn from the data are supported by evidence from the participants' narratives reflecting their interpretations of the factors that affect their m-payment adoption decisions. Such inferences are then used to guide the extension of the proposed research model and to develop the corresponding measurement items of the model's constructs. This chapter begins by outlining the characteristics of the study sample in section 5.2. Sections 5.3-5.8 discuss the participants' perceptions of the initially proposed factors. Section 5.9 discusses an additional new factor that was inferred from the data. In section 5.10, a detailed analysis is provided about the participants' perceived effect of the three suggested value-added services on the proposed factors. To further highlight the participants' most appealing added value, a discussion is provided in section 5.11 about their preferred value-added service. Section 5.12 presents some of the participants' proposed value-added services and discusses how they perceive added value through the lens of the research model. The overall findings are discussed and compared against previous research findings in section 5.13. In light of the findings that emerged from the qualitative data analysis, an extension of the research model is proposed in section 5.14, followed by a discussion in section 5.15 for the measurement items selection process. Based on the extended research model, section 5.16 discusses the required sample size adjustment for the subsequent quantitative analysis. Finally, the chapter concludes in section 5.17 by summarising the main findings.

5.2 Characteristics of Sample

A total of 23 interviews were conducted between November 2017 and April 2018. The number of interviews was determined by the data saturation principle, where the data collection ended when no new emerging themes could be identified. The interview duration ranged between 21 and 55 minutes, with an average duration of 37 minutes. Table 5.1 outlines a summary of the demographic characteristics of the participants. A more detailed outline of the demographic characteristics covering each participant is provided in Appendix 5.1. Given the unconditional sample selection in terms of prior m-payment experience, the interviews involved both adopters and nonadopters. Seven of the participants (30%) were adopters of proximity m-payment who have used native wallet apps provided by mobile device manufacturers, such as Apple Pay and Android Pay. Since the aim of this

study is to investigate the effect of offering value-added services in persuading consumers to adopt m-payment, the sample was purposely designed to include a higher number of nonadopters. The purpose was to fully understand such effect on the perceived barriers. On the other hand, including adopters in the sample has helped to understand the difference between both consumer types in terms of their perceptions of the benefit and sacrifice components of value.

Table 5.1 Demographic Characteristics of the Sample (23 Participants)

Measure	Group	Number of Participants	M-payment Adopters
Age	18–24	4	1
	25–34	11	5
	35–44	6	None
	45–54	1	1
	55–60	1	None
Gender	Male	16	5
	Female	7	2
Occupation	Employee	12	3
	Student	10	4
	Retired	1	None

As discussed in Chapter 4, the data analysis has employed the proposed initial research model as a starting point to further explore the existing themes of the model and allow new themes to emerge as the analysis proceeded. The following subsections discuss the findings of data analysis based on the participants' interpretations of the proposed themes, namely convenience value, monetary value, enjoyment value, social value, perceived risk, and trust in provider. In addition, one new theme discovered from the data, namely attractiveness of alternatives, will also be discussed. The participants' views about the effect of each of the proposed value-added services will then be presented and analysed.

5.3 Convenience Value

As discussed in Chapter 3, convenience value has been conceptualised as the consumers' perceived utility from the ease of signing up to and use of m-payment as a service which can be accessible anytime and anywhere. From the participants' perspectives, the convenience value of m-payment was predominantly identified in terms of ubiquity of the mobile phone. In this context, ubiquity meant that they carry their phones all the time with a multitude of applications that they use on the move. Having the payment facility integrated into the mobile phone, which is frequently used for a variety of other utilities, was perceived by adopters as a convenient alternative to conventional wallets. They also mentioned that making a payment through a mobile app saves them the effort of getting cards or cash out of a physical wallet. The following quotes from adopters illustrate these findings:

"*... if I had to choose between my wallet and my phone, I would choose my phone most of the time because everything I need is on my phone*" (Participant 1)

"... we always have our phones, but we don't always have our wallets, the closest thing you have is basically your phone. This is why I find [m-payment] very convenient" (Participant 17)

In addition, some adopters considered using m-payment for small amount purchases as another convenience factor. Their reasoning could be attributed to two aspects, saving the time of handling coins and exerting less cognitive effort to quickly pay for small amounts as illustrated by the following adopters:

"*I use it especially when the value of the purchase is very small, below 10 pounds, I tend just to use my mobile straightaway*" (Participant 2)

"*… it is quick payments, small things so I think the 30 pound limit is a good thing, I am quite happy with that. I don't think it should be, say, 50 pounds because then you would be doing your weekly shopping that requires a bit more thought*." (Participant 9)

Although some of the nonadopters have acknowledged the convenience of m-payment in terms of ubiquity of the mobile phone, they appeared to be sceptical about convenience when they compared m-payment with the contactless card they currently use. Many nonadopters perceived m-payment as less convenient and more time consuming than contactless cards based on perceptions of the complexity involved, including the need to find and launch an app. The following quotes from nonadopters illustrate these views:

"...[m-payment] doesn't add that much extra convenience at all to be perfectly honest. It's just convenient to pull out a contactless card and tap it against the machine than it is to pull out my phone and get the required app for the payment" (Participant 10)

"... my worries are that to use it I'd have to first get into login to the phone and then I'd have to start an app you know by the time I've done this I'd have wasted time, while the card seems to work without requiring a PIN code most of the time and as I say it's always in my pocket so something I have on me normally so there's not a great push factor I guess to use the phone" (Participant 16)

The above findings indicate a clear difference between adopters and nonadopters in terms of defining m-payment convenience value. Whilst adopters approached the meaning of convenience based on their actual use of m-payment, nonadopters were predominantly influenced by their experience of contactless cards. Consequently, their perceptions about the convenience of m-payment were negatively influenced by their satisfaction with the contactless card experience.

5.4 Monetary Value

In response to whether participants perceive m-payment as a means to save money, almost all of them stated that they do not see an economic value from using m-payment. Adopters have explained that their expenditure would be the same regardless of the payment method used. Some adopters went further to say that using m-payment has caused them to overspend due to the ease of access to payment compared to using cash. In addition, the intangibility of the amount of money being paid using m-payment appears to have increased their expenditure compared to using physical cash.

> "*No, it doesn't really save any money because it is still money, whether it is on the card on the phone or cash, it is still the same amount of money*" (Participant 17)

> "*I think the negative side of it is having the easy access to it, so I buy a coffee or this sort of thing, just with one click, I find it easy comparing with cash because if I don't have cash sometimes I would rather not to buy a coffee and wait or go have a coffee at my office and prepare my coffee myself. But once I have my mobile payment with me it's really even encouraging me to pay it off because it is very accessible*" (Participant 8)

> "*So, in the past before the app, I would prefer to walk the 20 meters rather than finding coins to pay for the bus and now I am spending the same amount of coins using the app but may be because I don't see the actual coins…"* (Participant 1)

Likewise, most nonadopters did not perceive any potential savings from using m-payment as a payment method per se. They elaborated on this by assuming that all payment methods link to the same account. On the other hand, a few nonadopters perceived a potential financial benefit from using m-payment only if it provides financial incentives, like those they receive when using some credit cards. In this regard, the economic benefit they explained is not related to m-payment as a new method that helps to save money. Instead, the financial offers that could potentially be associated with using m-payment seem to emphasise perceptions of monetary value.

> "*…it all comes from the same place, so probably … it's kind of the same thing however where I am paying for it, it is still coming out of my account*" (Participant 5)

> "*…it makes me wonder if there is [monetary value], I though it is just another way to pay with no financial benefits*" (Participant 22)

> *"With my cards that I use, I've selected the cards that I use because they are reward-based cards so I've got two credit cards that have rewards, I get loyalty points that I can use. So, I choose to pay everything on that to maximise the money that I am getting back. I don't know if that exists with a mobile phone option with that thing, but that would be, I can see, appealing"* (Participant 4).

In terms of monetary cost, most participants saw no extra transaction fees associated with using m-payment. Moreover, other types of cost, such as network charges and mobile phone cost, were very rarely mentioned. This finding indicates that cost is not considered as a barrier to m-payment adoption.

> "*The charges that you will incur normally for a phone payment are going to be incurred for any sort of online or mobile payment. So, I don't think there's any additional costs*" (Participant 12)

These findings suggest a general agreement between adopters and nonadopters in terms of their perceptions towards the monetary value of m-payment. Adopters were confident to confirm that they did not see any monetary value from using m-payment. Similarly, nonadopters were reluctant to attach any monetary value by assuming that m-payment, as any other payment method, is just a new payment instrument that provides no additional economic benefit on its own.

5.5 Enjoyment Value

In the context of this study, enjoyment value represents the emotional aspects that could be derived from using m-payment, such as the positive feelings of fun or pleasure. Many participants have linked emotional aspects of joy to the extent to which m-payment is intuitive and convenient. In addition, the app design aesthetics were considered by some adopters as a factor that might lead to some affective states. Furthermore, adopters have expressed their enjoyment in using m-payment in terms of emotional states, such as satisfaction and 'feeling good', that they associate with the way the payment is made and the interactivity of the m-payment app. This was evident in their expression of enjoyment when they described the ease and speed of payment and the successful payment notification that they receive from the app.

> *"... it doesn't take you through loops to prove who you are, it's just you click or tap with your phone and then they know who you are. So, I think the enjoyment comes from the convenience rather than any exclusive enjoyment source*" (Participant 17)

> "*Weirdly, when I moved from iPhone to Samsung, and because Samsung is just a lot easier, I now get a little bit of joy in comparison ... and I will get that very satisfying buzz*" (Participant 7)

> "*My experience when I hear the sound from my mobile which is the beep when I make the payment, it makes me feel good*" (Participant 8)

In a similar vein, nonadopters have mainly derived their enjoyment perceptions from convenience-related facets, such as ease of use and quick access. Although these perceptions were based on a comparison between m-payment and existing traditional payment methods, they further indicate that

nonadopters seem to associate positive emotional aspects with the degree of convenience that m-payment provides.

> "*I'd probably find it more enjoyable than using chip and PIN, but that comes from the ease factor*" (Participant 10)

> "*That [enjoyment] would depend very much on how easy it is to use the app, if it is not very intuitive or it's got a bad layout, that would be quite frustrating and annoying*" (Participant 15)

Regardless of any previous m-payment experience, the above findings illustrate the presence of enjoyment factor as a component of m-payment perceived value among the participants. Although some participants have cited specific app design aspects as a source of enjoyment, such as layout and app notifications, the findings indicate that enjoyment is mainly derived from convenience-related perceptions.

5.6 Social Value

This study has conceptualised social value as a source of self-appreciation perceived from the impression conveyed by peers in a social context with regard to the use of m-payment. Participants who perceived a social value have expressed it in terms of the good impressions that others would make of them for being up-to-date with new technologies. They also perceived that using m-payment would enhance their social interaction and establish a social identity within their peer social groups with m-payment experience. The following quotes from adopters and nonadopters illustrate these perceptions:

> "*I was talking to friends … and a few of them do use mobile payment and I had to say I hadn't used it [m-payment] before. So, I suppose if I did use it, I would be similar to them*" (Participant 15)

> "*I think, within the group, that would enforce perhaps some identity of 'we are cutting edge technology users', yeah I am sure that would have an implication*" (Participant 21)

> "*…when I invite friends for a coffee or this sort of things, when I pay using my mobile in front of them, they get surprised and they say well this is really craze! how you do this? can you tell us what's this?*" (Participant 8)

In contrast, more than half of the participants, regardless of their previous m-payment experience, were hesitant to associate any social value with using m-payment. In this regard, they seemed to give little, if any, importance to the way others think of them when deciding whether or not to use m-payment. For instance, some participants, who were in their thirties and forties, said that social value is not relevant to their age group, suggesting that it might be more appealing to younger users.

However, some younger participants recognised using m-payment as something 'cool', but they seemed to be less convinced to consider social image as a factor that encourages them to adopt m-payment. They attributed this to the fact that making payment represents a private matter that is not usually observed by others.

> "*It [social value] has never been a factor that I have used to decide whether or not to use it [m-payment] or not … although if I was younger I might, me five years ago, I would probably care a bit more*" (Participant 7).

> "*normally people who pay with their phone I think of them as cool people, but it's not enough reason for me to change to that payment method*" (Participant 13)

> "*It's kind of a cool thing, I would say probably. I don't really see any change for the social life … because nobody looks at me how I pay my stuff, I don't know*" (Participant 14)

Some participants went to the other extreme by associating a negative social impression with using m-payment. In this regard, one participant said that using m-payment might be perceived by others as a kind of showing-off that he is using a new technology that's not widely known. Another participant explained that social communication might be negatively affected because of the distraction that could result from interacting with the mobile phone when making payments.

> "*…they might see it [m-payment] as showing off, I am not convinced that it's necessarily wholly positive*" (Participant 6)

> "*I think, in some way, that [m-payment] actually has a bad impression because when you're out with friends and you're getting your phone out constantly you will be looking at it, you will be checking it, and somebody might be messaging you at which point you would reply and that so most anti-social*" (Participant 12)

The findings indicate that both adopters and nonadopters are divided on attaching a social value to using m-payment. Participants who perceived a social value believe that using m-payment would enhance their social image among their peers that have interests in new technologies. On the other hand, participants that could not see a social value have shown less interest in other people's opinions, particularly when the subject is related to financial matters.

5.7 Perceived Risk

As a value inhibitor, this study has conceptualised perceived risk as the consumer's belief of uncertainty regarding the security of m-payment. Although some adopters have mentioned that they are aware of potential risks involved in using m-payment, the findings indicate that perceptions of risk were higher among nonadopters. Whilst adopters described potential risks as being avoidable or less likely to stop them from continuing to use m-payment, nonadopters seem to perceive these risks

as a major barrier. The risks that were identified by nonadopters can be classified under the following three main categories:

- **Identity and payment information theft**: this was mentioned by many participants as a consequence of different incidents, including loss or theft of the phone, hacking into the phone either directly or through wireless networks, or as a result of a mass security breach targeting the provider's system. Surprisingly, mobile phone loss was the most mentioned potential risk among participants despite of their awareness of the additional security measures provided in mobile phones, such as passcode and biometric authentication. Moreover, many participants were particularly influenced by the news of mass cyber-attacks that some well-known service providers have encountered in recent years.

  > "*I also think that I hadn't done it [m-payment] because I wouldn't know how secure it would be, I would feel like if I lost my phone then whoever had it would have everything which is silly because if I lost my purse I know I could just cancel my cards and I am sure it would work somehow if I lost my phone*" (Participant 4)

  > "*My main risks would be if your phone got stolen people can potentially, especially if you haven't got a password on your phone which in this day and age is naïve, but people can then very easily make payments*" (Participant 12)

  > "*we have seen recently significant data breaches in various forms…Apple is a big company, Google is a big company, that makes them big targets*" (Participant 19)

- **Privacy concerns**: some participants have highlighted their concerns about the way m-payment service providers would deal with their stored payment information. They seemed to be highly influenced by the increasing media reports about data misuse by some technology service providers and the fear of unauthorised sharing of sensitive information with third parties.

  > "*I am a little bit cautious at the moment and of course the other thing now…is all of the information that is coming out about our data through Facebook, so in general my sense of trust in these providers has just dived*" (Participant 21)

  > "*Once you have got the digital side of the mobile phone there's all this stored data, you have in the chip in the card I suppose, it just seems more manageable and simpler*" (Participant 22)

- **Reliability of the mobile phone**: some participants have mentioned the limitation of phone battery life as a potential risk. In this regard, they associated the risk of being unable to access the m-payment service with a phone battery outage situation.

> "*my phone runs out of power this happens a lot…If my phone runs out of power, which is likely to do, I have no money*" (Participant 10)
>
> "*I can't rely solely on purchasing on the spot with my phone because the battery can die, and it will just be an extra thing*" (Participant 18)

In this regard, an adopter has acknowledged her awareness of the phone battery life issue as a potential risk. However, as she explained, this risk does not seem to be deterring her from continuing to use m-payment as her preferred payment method while taking necessary precautions to avoid the battery outage risk.

> "*The only risk I've ever had on my phone is my phone battery dying when I've been reliant on it, and I think we've all been through that. But now, I think I have such an understanding about my phone, there's a battery, and as I wander around, I'll always have a charger in my bag. So, I think I mediate that risk to the best of my abilities. And if I am ever concerned, if I am going away, I'll always take the card with me just in case*" (Participant 7)

These findings illustrate a clear contrast between adopters and nonadopters in terms of m-payment risk perceptions. Whilst adopters gave little importance to the potential risks of using m-payment based on their knowledge of the technology, nonadopters exhibited their concerns towards such risks as a significant barrier.

5.8 Trust in Provider

Regardless of their previous m-payment experience, most participants mentioned that they would perceive fewer risks with a given m-payment service if the provider is trustworthy. In this regard, adopters recognised trust through the security features integrated into the m-payment app, and in the phone in general, as an indication of the provider's ability to protect their sensitive information.

> "*So, first of all, logging into my phone, passcode, face [recognition], I am pretty happy with that. Secondly, the ability to lock my phone if it gets lost straightaway, I don't need to worry about that and that means that all of my cards are locked straightaway ... So, I think there's a kind of inherent trust just based on the fact that I have much more control on the device if something was to go wrong*" (Participant 7)
>
> "*…the security measures they [the service providers] are using, I think, play a vital part in choosing this way of payment compared with other payment methods*" (Participant 8)

On the other hand, nonadopters relied upon their assumption that financial services are generally regulated and that providers of such services must comply with certain standards to safeguard sensitive payment information. Although the most popular m-payment apps are provided by

technology companies, most participants were more inclined to trust well-established financial institutions, such as banks and card networks, because they are known for their strict regulations.

> "*… they [m-payment providers] are safe because it is a regulated market, so no service could offer this without being regulated, and to be regulated certain standards have to be upheld…"* (Participant 3)

> *"I think in the financial sphere there are a lot of regulations and a lot of systemic methods of providing trust. So, for example, in savings, your first 80 thousand pounds within an institution is guaranteed by the government. So, if my institution falls under that scheme, trust isn't a huge [issue]"* (Participant 19)

In addition, a clear majority of the participants considered the company size of the provider as an important aspect of trustworthiness. The size was mentioned to indicate the popularity of their services that have gained the trust of a significant customer base.

> "*…when we have a service that is delivered, operated and managed by a global software and mobile operator, then we have this belief that it is going to be alright*" (Participant 2)

> "*…if it [the provider] is big, then lots of people use it, and because lots of people use it, that generates a sense of confidence*" (Participant 21)

The reputation of the provider of m-payment was mentioned by some participants as another aspect of trust. They perceived reputation in terms of whether a provider has encountered data breaches or security issues in the past. Such incidents were mentioned by participants as a sign of the provider's incompetency to protect consumers' sensitive information.

> "*…Has there been any big news reports about massive data breaches in that company? … if you were to hear that kind of thing, that would very much put me off*" (Participant 19)

> "*There have been some concerns for different apps and some which I definitely wouldn't trust my data with, but I tend to evaluate the company's history before I input my card data*" (Participant 20)

The provider's commitment to resolve any issues associated with the service was also mentioned as another dimension of trust. Some participants explained that being aware that a provider is committed to rectify payment-related issues would enhance their trust towards such a provider.

> "*once, I think Apple charged me like 12 pounds for SoundCloud subscription and I knew that I probably have subscribed by mistake, I can't remember what happened exactly. I contacted them and said no I didn't subscribe to that and they said ok we will cancel your subscription and pay you back, and they did. So, this provides some sort of trust because I know that if*

anything goes wrong then someone is going to find the case and try to sort it out" (Participant 17)

"*even though I had a bad experience with them [her bank], I guess I still trust them, and they correct anything that's wrong, I would rely on that*" (Participant 23)

It could be inferred from the findings above that adopters and nonadopters were similar in terms of the aspects that they consider in order to assess the trustworthiness of m-payment providers.

5.9 Attractiveness of Alternatives

In addition to the factors that were initially included in the proposed model, a new factor has emerged as a significant barrier to m-payment adoption among nonadopters, namely attractiveness of existing alternatives. Existing alternative payment methods appear to have a strong negative effect on the overall perceived value of m-payment. An overwhelming majority of nonadopters referred to the contactless card as a benchmark to assess the convenience of m-payment and its acceptability at merchant payment terminals. Many of the participants considered using a contactless card as more convenient and accepted than m-payment. The findings suggest that m-payment is perceived as more time consuming at checkout due to lack of knowledge about m-payment among nonadopters. Their satisfaction with the contactless card experience appears to be blocking any need to seek information about the new m-payment method. This has led to their belief that extra steps would be involved to initiate the m-payment app as opposed to the contactless card which is always ready for payment.

"*I don't have the need for it [m-payment], so the alternatives I have available to me are good enough and I actually really like the contactless [card] payment solution. In fact, I feel having to take out my phone and unlock the phone, hit the app, and hope it all works, will probably be less convenient and less efficient than just taking out my wallet and my card. So, I feel like it would take more time in the queue as well, potentially, than just using a contactless card*" (Participant 3)

"*If anything, the mobile phone is slower than the contactless [card] payment because in both cases you have to get the card or the phone out, and for the card once you got it out you just tap it*" (Participant 10)

"*I don't think that you could get more convenience than [contactless card], unless you put a microchip in your wrist*" (Participant 21)

"*I think my card is convenient enough that I am not going to look for an alternative because the benefit that it is giving me is being fast at the checkout which is fine*" (Participant 19)

Furthermore, due to their lack of information about the similarity of contactless cards and m-payment in terms of NFC technology, nonadopters appear to believe that m-payment is less accepted among retailers as compared to the commonly used contactless card.

> "*I wouldn't know if I would have to place a mobile phone on a separate…do you put it on the card machine or do you put it on a separate thing I am not entirely sure, I don't know*" (Participant 15)

> "*At the minute, I assume that 95% of shops will accept the contactless card but my assumption is probably there are only 50% that will accept the NFC payment, I could be wrong about that, this is my assumption*" (Participant 16)

More interestingly, some nonadopters expressed their willingness to consider using m-payment if they are offered a clear benefit over using a contactless card despite the perceived risks that they mentioned. Consequently, the degree to which an added value is perceived from using m-payment appears to have a significant effect on minimising both the impact of the perceived risks and the attractiveness of existing payment alternatives.

> "*The main barrier that needs to be overcome is that I don't see enough other reason to try to overcome them [the risks]. Those risks can be mitigated, I don't get enough value out of taking those risks*" (Participant 10)

> "*if somebody might be able to hack into your phone and just make payments somehow so I have thought about it and I've seen people doing it [m-payment] and it makes them say how great it is but I just haven't really understood how it will benefit me over what I am doing at the moment*" (Participant 23)

> "*it would be convenient to pay with my phone just like I do with everything else but at the same time like I said it's not really that much of a necessary alternative…I haven't used it not because of risks, I haven't used it just because it's not a lot more convenient than just using my card*" (Participant 18)

These findings suggest that nonadopters appear to see less need to change their current payment methods, particularly the contactless card, due to two main reasons. First, the current payment methods offer a satisfactory level of convenience and high acceptability in retail shops. Second, the emerging m-payment method does not seem to provide additional benefits over the current payment methods.

5.10 The Effect of Value-Added Services

The following subsections describe how participants perceived added value in an m-payment app integrated with the suggested value-added services. The discussion is focused on understanding how

each individual service is perceived to enhance or inhibit the perceived value of the augmented m-payment app in terms of the factors discussed in the previous sections.

5.10.1 Instant Balance

The participants have perceived an added **convenience value** from integrating an instant balance service into m-payment apps in terms of saving the time to check the balance using a different app or channel. As an app used on a daily basis, the participants perceived that checking their balance using the m-payment app would be more convenient than having to use a mobile or Internet banking app or going to the ATM machine.

> "*It means that I don't have to go to different places to find the same information, certainly very convenient*" (Participant 11)

> "*I don't normally go and check my balance before each and every purchase, but I do check my balance regularly which would make it more convenient that it would be easier like I would know my balance after each purchase*" (Participant 13)

Although some participants mentioned that they don't need to check their account balance before each payment, they embraced having a real-time balance update before and after payments. This is because the payment methods they currently use do not provide such a feature.

The added **monetary value** was perceived by the participants through the potential ability to eliminate overspending associated with using cashless payment methods, such as cards. They mentioned that seeing the account balance before making a payment would help to reduce 'blind' payments and 'impulse' purchases resulting from the absence of physical cash. Furthermore, one participant, who mentioned that he has a joint account with his wife, explained that having the ability for both to see the balance from their individual m-payment apps would help to better manage their finances.

> "*I do feel even more distant and I catch myself overspending … Having lost cash, and the solidity of what your money is, I and everyone I know has become a bit more lax with how they spend money. And I think a lot of us is trying to work out ways of regaining that tangibility of the money that you have, but without having to actually tangibly touch any money… I do think that [instant balance] would be very helpful actually*" (Participant 7)

> "*…it would certainly help me to be aware of how much money I was spending and that in turn might then allow me to tell I've only got a hundred pounds left in the account rather than the two hundred that I thought I had, so perhaps I won't buy this thing, so I guess in a way it would help*" (Participant 21)

"*...my wife has a joint account with me, so yes I think if we could both see what the account balance is, yeah that would be useful, focus minds*" (Participant 9)

Additionally, some participants anticipated that seeing the balance before and after the payment would help more with budgeting rather than being a means of direct money saving. However, participants who seemed to be organised in terms of their finances were hesitant to recognise any monetary gains from checking their balance before or after payments.

In terms of **enjoyment value**, some participants mentioned that they will enjoy the whole payment experience because of the extra convenience they perceive in the instant balance value-added service. In this regard, the participants have linked affective states, such as being worry-free about their finances and having a better quality of life, to having the ability to check the balance in real-time.

"*I think overall it [the instant balance] would really help. So, one thing with contactless [card], it doesn't update [the balance] as quickly, so ... you spent money, but you're waiting a few days for it to come out. So, having it there in front of you would be very useful. So, yeah I would enjoy it*" (Participant 5)

"*It would just make me have a greater quality of life; it would just be another thing that I don't have to do every week because I am already doing it every time I pay*" (Participant 20)

On the other hand, some of the participants did not perceive an added enjoyment value as a result of augmenting m-payment with instant account balance by considering the emotional aspects to be irrelevant.

Similar to the case of m-payment as a sole service, most of the participants did not associate an added **social value** with m-payment augmented with the instant balance service. Participants who discussed a potential added social value explained it in terms of how beneficial it would be to others rather than being a self-gain in a social context. In addition, those who perceived a self-gain were hesitant to give a significant importance to the added social value as an appealing factor to use m-payment.

"*Yeah, I could see how it [instant account balance] could be useful for them, I wouldn't like them to see my balance. Yeah, I think it would a selling point for the app or the service*" (Participant 15)

"*Yeah, I think it might be a novelty aspect. I am someone who is interested in new technology and I do like showing other people what technology I have, so that might be a small pull factor*" (Participant 16)

In terms of the effect of the instant balance service on **perceived risk**, the participants have identified two additional privacy concerns associated with the service. The first is the possibility of being a victim of shoulder surfing, where participants frequently mentioned that they wouldn't want their

balance to be seen by others. Some participants added that control measures should be in place to choose when and how the balance is displayed.

> "*if I am paying and someone else can see my balance, they will be like oh! He's got a lot of money*" (Participant 19)

> "*… someone could see the balance. There's something weird about your bank balance as being a bit of a private thing…So if they could make it something that I could keep secure and safe and change how I wanted it to be, and may be having something like 'do you want to see your balance', then I can't see it as being a negative thing*" (Participant 7)

Secondly, many participants were reluctant to allow third-parties to access their account information through the instant balance service. They considered their financial information as a private matter that should not be shared with any third-parties. Some participants expressed their concerns about the extent to which their information would be used by third-parties. They added that they will consider the instant balance service as safe only if it is provided by their bank that already holds their account information. In contrast, a few participants appeared to be more open to the service by saying that the decision of sharing their account information will be dependent on the identity of the third-party provider of the app and whether they trust it.

> "… *I think there is this issue around what they say they are doing with the data and what they are actually doing with the data … at the moment I think I will be quite reticent to share [balance information] … I think that might be one of the reasons why I haven't necessarily tried it [m-payment]. I think: Do I really want to give Apple my bank details in an app? So, I think in the moment, I'll be a little bit nervous*" (Participant 19)

> "*You'll then wonder who is asking for my balance rather than presenting your card then give payment. If they've got access to what is your balance, then I probably want it to be my bank that is offering that rather than somebody else checking my account*" (Participant 9)

> "*There is a risk with every single step we do in our daily activity. But still it depends on who is asking for authorisation, if it's like a trustworthy company … I think it should be fine, I won't say no*" (Participant 8)

Some participants have considered instant balance as a service that could enhance **trust in provider** of the service. Different measures were used by participants in describing the added trust, mainly including the increased transparency about their financial information that they miss in their current payment methods, making it easier to have balance information in a payment app, and more generally the provider's awareness of consumers' needs. These findings suggest that the instant account balance service seems to tackle issues that the participants encounter with their current payment methods, leading to a positive trust perception in the provider.

"*To put it all in the same place for you to view and use, that does go to a level of trust for not hiding anything behind anything*" (Participant 11)

"*If it was made easy to use then I would think then that the provider had done some market research to onboard the users' concerns and so I probably would trust them more than if it was an app which is very complicated*" (Participant 16)

5.10.2 Loyalty Card Integration

Integrating loyalty cards with m-payment was perceived by most participants as an added **convenience value** in terms of easier manageability of loyalty cards of different retailers in one place and reduced transaction time at check-out. Easier manageability meant eliminating the need to carry multiple physical plastic cards of different retailers, whereas reduced transaction time was perceived as a result of not having to fetch the loyalty card from the physical wallet.

"*it [added convenience] means I wouldn't have to carry around so much with me and it would reduce that sort of: Oh! have I got the right things? it would all be there in one place*" (Participant 4)

"*you currently have to hand over two cards, here's my loyalty card and here's my payment card so there is no question that it would factually speedup the process plus you would never forget them*" (Participant 19)

On the other hand, some participants noted that the need to scan a digital version of the loyalty card stored on the mobile phone does not offer much advantage in terms of convenience over scanning the physical card. They suggested that the integration should be seamless, where the m-payment app recognises the retailer being paid for and transfers the points to the respective stored loyalty card.

"*My biggest issue that I have at the moment with loyalty cards is I will forget that I've got one. But I don't see how having them in a list on your phone changes that difficulty. If there was some way that doing the payment could automatically know [which loyalty card] and automatically apply it, that's a massive convenience factor*" (Participant 10)

The added **monetary value** that participants perceived in integrating loyalty cards into the m-payment app was based on simplifying the process of earning more loyalty points. They mentioned that they frequently miss loyalty points because they often forget bringing loyalty cards or scanning them at checkout. Having loyalty cards of different retailers visible alongside payment cards was observed by some participants as an efficient way to increase the utilisation of loyalty schemes.

"*…sometimes I forget to take the loyalty card out and use it or sometimes I am in a rush and I don't bother to use it so if it was automatically enabled on the phone on the app I think it would save some money…*" (Participant 16)

"*it would be easier for you to use them to collect points and these points could be transferred into monetary value*" (Participant 17)

The added **enjoyment value** perceived by the participants was mainly derived from the added convenience and monetary value. They frequently explained their perceptions of enjoyment in terms of simplifying the management of loyalty cards in one app. On the other hand, some of the participants perceived that they would enjoy being rewarded with loyalty points for payments they make through the app.

"*[integrating loyalty cards] will make it [m-payment] a massive enjoyment value, because I derive enjoyment from convenience and ease, that would take out an entire thought process of what I have to do and make it so simpler and save me money*" (Participant 10)

"*I am very careful with my money and I really enjoy the feeling of being rewarded for that sort of careful nature and I really enjoy knowing you've made good financial decisions*" (Participant 4)

Most of the participants did not perceive any added **social value** from integrating loyalty cards with m-payment. Thus, as in the case of instant balance service, it appears that participants associate little or no social value to the loyalty card integration as an additional m-payment service to be discussed in a social context.

In terms of **perceived risk**, most of the participants perceived little or no additional risks associated with integrating loyalty cards with m-payment. However, a few participants mentioned privacy concerns as a potential risk. In this regard, one participant explained these concerns in terms of the extent to which his shopping information associated with loyalty cards would be utilised by the m-payment app provider. Participants who suggested the seamless integration of loyalty cards through a smart m-payment app also highlighted their worries about sharing their transaction information with the app provider. This indicates that some participants appear to be reluctant to trade-off their privacy for a more convenient payment method.

"*It depends again on how much access to your loyalty card data does this third party have. I don't necessarily want [the m-payment provider] to know where I am with the GPS on my phone, how much I am spending through the data on my card, and what I am spending it on through the data on my loyalty card, no I think that is a lot of data*" (Participant 19)

With regards to **trust in provider**, participants were divided about recognising an effect of integrating loyalty cards on their trust in the provider of the m-payment service. Whilst some participants perceived no effect, others explained a positive effect through two dimensions. First, integrating loyalty cards into m-payment apps was considered among some participants as an indication of collaboration between the m-payment provider and the retailers offering the loyalty

scheme. In this regard, they considered an m-payment provider as more trustworthy because of being trusted by retailers with whom they are familiar. The other dimension, which was also mentioned in the instant balance service, relates to the perception that the m-payment provider is aware of the consumer's needs through integrating an additional service that resolves an issue in the payment process.

> "*it [loyalty cards integration] shows that businesses are working together because if it's got different loyalty cards from different stores on there, it shows that they're all working together, so, I see it as a quite trustworthy scheme*" (Participant 5)

> "*if they are trusted by all people that I am dealing with using their loyalty cards, if they are trusted as a third party by [retailers names] for example, then they must be trustworthy for me as well*" (Participant 13)

> "*I would tend to trust the provider more because I would think that they have looked up at what customers wanted and implemented this, so yes it would give me a better impression*" (Participant 16)

> "*if the companies do really care about consumers, if the companies allow us to combine the [loyalty] cards in one place and synchronise with our payments, that would enhance our trust and would make me really feel that they are trustworthy*" (Participant 13)

5.10.3 Cashback

Most of the participants did not perceive an added **convenience value** from cashback by indicating that it is a financial benefit that would not impact the usability of the app. However, a few participants, who were familiar with cashback schemes, have perceived an added convenience value by explaining that integrating cashback into m-payment apps would automate the process of claiming cashback and locating deals. One participant recognised convenience in terms of the app's capability to contextually identify and suggest cashback deals based on location and payment patterns.

> "*Very convenient! At the moment, to get a cashback, it is swapping between different credit cards and working out which deal, but if it is all on your phone then all that extra effort is worked out for you that would be fantastic*" (Participant 5)

> "*…it is quite helpful because if I am in town deciding where to eat then my first thought would be my app to see if there are any offers that I can claim because it is just really useful to get the same food but for a cheaper price*" (Participant 20)

An added **monetary value** was perceived by many participants as a financial incentive to use m-payment. For some participants, the monetary value seems to outweigh their negative perceptions towards the convenience of m-payment. This finding suggests that financial incentives, such as

cashback, could potentially add value by balancing against other negative perceptions associated with m-payment.

> "*I suppose if it [cashback] does make the paying process in anyway longer or more convoluted then … it's definitely an inconvenience that I would put up to save a bit of money*" (Participant 15)

> "*I am still slightly wary about my details being held somehow … in a mobile phone. But … if someone said to me actually if you paid by your phone you would get 10% off your shopping if you went to this shop or something, if only that was the case, that would definitely give me a reason to use it instead*" (Participant 23)

Many participants have also associated an added **enjoyment value** with cashback. The added enjoyment value seems to be a direct result of the perceived monetary value associated with cashback. The participants appeared to be very enthusiastic about getting discounts as they spend by explaining that getting money back would make them feel happy or in a better mood.

> "*I like free things so that would make me happy*" (Participant 12)

> "*If I am getting some cashback then I would feel better*" (Participant 16)

Although some of the participants mentioned that discussing m-payment cashback within their social groups would impress them about the service, they seemed to be reluctant to acknowledge any significant **social value**. The fact that this finding agrees with the findings that emerged from the other proposed value-added services indicates a weak association between social value and adoption of financial services among the participants. This could be attributed to the sensitivity of discussing financial matters in a social context, which has been explicitly mentioned by one participant as follows.

> "*I am British we don't talk about our money! Whether it [cashback] would enhance their view of me or not, I am not convinced that it would*" (Participant 21)

In terms of **perceived risk**, most of the participants perceived no additional risks associated with m-payment cashback. One participant stated that cashback would give him a reason to accept the risks he perceives in m-payment in return for a monetary value.

> "*Well it [cashback] is a positive to weigh against the negative, it doesn't reduce the downside risk, but it adds something on positive side to balance against it*" (Participant 6)

The effect of cashback on **trust in provider** was mentioned by some of the participants in terms of two different dimensions that can be linked to pre and post m-payment adoption stages. Some participants said that the more participating stores there are in the cashback scheme, the more likely

they would consider the m-payment provider as more trustworthy. They attributed this to the fact that a larger number of stores indicates that the provider is already trusted by these recognised stores. On the other hand, some participants anticipated that perceptions of trust would increase if the provider keeps the promise and offers the cashback as advertised.

> "*It [cashback] might make me more inclined to trust them because if they've got partnership with major stores that is obviously even more legit than you would hope*" (Participant 12)

> "*if it was genuine and did actually happen, I would actually trust them more*" (Participant 11)

5.11 Ranking of the Proposed Value-Added Services

After eliciting participants' views about the proposed value-added services, this research has sought to understand their most appealing value propositions in terms of the theorised value components. One approach was to ask the participants to rank the three proposed value-added services in order of preference and justify their choice of the top-ranked value-added service. Their responses were then coded under the respective value component. Table 5.2 summarises the participants' main reasons for choosing the most preferred value-added service.

Table 5.2 Participants' Reasons for Choosing the Most Preferred Value-Added Service

Top-Ranked Value-added Service	**Number of Participants**	**Reasons of Choice**	**Respective Value Component**
Instant balance	8	Real-time account balance	Convenience
		Easier account management	Convenience
		Restore money tangibility	Convenience + Monetary
		Avoid overdraft	Monetary
Cashback	7	Easier to find deals	Convenience
		Saving money	Monetary
Loyalty cards integration	6	Easier loyalty card management	Convenience
		Saving money	Monetary
None	2	No additional value	None

Instant balance was ranked as the most preferred value-added service by the highest number of participants, closely followed by cashback and loyalty card integration. Two of the participants did not give any preference to any of the suggested value-added services due to seeing no added value that fits their needs. The relationship between the reasons and the related value components indicates that convenience and monetary value components represent the main drivers for choosing a given

value-added service. This finding further emphasises the importance of utilitarian value components among consumers when deciding to adopt m-payment.

5.12 Value-Added Services Proposed by Participants

To further understand how value propositions are evaluated in a m-payment context, the participants were asked to propose a value-added service that they considered as a significant addition to m-payment apps based on their individual needs. The purpose was to gain insights into issues that the participants encounter in the payment process and how they perceive the added value from the additional services that they suggest. Moreover, this approach was also followed to enrich the findings beyond the initially suggested value-added services. Taking into consideration that some of the suggestions were related to remote m-payment scenarios, such as peer-to-peer payments and utility bill payments, only the suggestions potentially relevant to proximity m-payment scenarios will be discussed.

5.12.1 Spending Tracker

Four participants (2, 9, 13, 20) suggested augmenting the m-payment app with a dashboard or chart that categorises their expenditure based on where they spent money, i.e. groceries, restaurants, transportation, etc. The features suggested by the participants mainly included a historical record of transactions categorised by merchant. Some participants acknowledged that they are aware of third-party apps that offer this service, however they perceived that having such feature within a frequently used m-payment app would simplify visualising their spending and help with budgeting.

> "*one of the things that I would love to see is to have a sort of dashboard where you manage your spending … that sort of dashboard to check everything of my spending throughout the month across different categories*" (Participant 2)

> "*Monthly reports of my spending categorised, useful insights of how I spend my money and more ways to save money. For me, if I have this service, it would make it [m-payment] worth using because I am using a different service just for that*" (Participant 13)

5.12.2 Recommendations Based on Spending Behaviour

Two participants (3, 5) suggested that the m-payment app should be able to analyse transaction information and suggest recommendations based on historical data, such as store names, locations, and spending behaviours. One participant mentioned that a service that recommends offers and promotions made by stores that she frequently uses would be very useful in saving her time to find deals.

> "*It could be quite good for promotions, so if it knows that you shop at a certain store and they can track the store they know they've a got a promotion coming on, seeing that kind of*

popup would be quite useful. So, you kind of know what's happening with that store" (Participant 5)

"*using historic payment data in a machine learning system to analyse consumer behaviour of the individual and then give interesting feedback to the user based on that analysis. I think that could be a real added value in terms of mobile payments … As a minimalist, I am interested in improving my consumption, so I want to spend less on better quality things. So, I feel like data could help me achieve that goal*" (Participant 3)

5.12.3 Digital Receipts

Participant 18 suggested storing digital receipts associated with her payments categorised by merchant into the m-payment app. She appeared to be very enthusiastic when she explained how this feature would save her the time and effort of searching for the right receipt when she needs it.

"*if it stores your receipts depending on the store. So, like by retailer, it digitally stores all the receipts so as soon as you pay with it you get this receipt right there and then you can keep it on your phone besides the physical receipt, then that might be actually a significant addition shall I say because it saves you the hassle of going to look for receipts if you need … that would actually persuade me to use a mobile payment app, it would I think!*" (Participant 18)

5.12.4 Multipurpose Digital Wallet

Participant 15 discussed the possibility of integrating other types of cards into m-payment wallet apps to replace traditional physical wallets. As a nonadopter, he explained that even if he considers using m-payment, he would still need to carry his physical wallet that includes other important non-payment cards, such as a railcard discount card and a driving licence. He added that integrating such cards so that they become officially accepted in a digital format would give him a good reason to use a m-payment wallet. The usefulness of such multipurpose wallet, as he explained it, could be linked to the added convenience he perceived in the ease of managing multiple cards of different purposes in one place.

"*This might be going a bit too far, but in terms of replacing my wallet … if you could add things to it which aren't directly payments but help me get discounts, that will be useful. If somehow you get an official driving license for example if I could get all of that, I would probably get rid of my wallet quite possibly, but the wallet is useful because it contains other cards, if it could be officially recognised on a phone that would be useful*" (Participant 15)

The reasons that the participants explained for suggesting these services are clearly based on utilitarian benefits that represent convenience and monetary value components. These suggestions

provide an evidence of the importance of the utilitarian added value in the context of m-payment, which is also congruent with the findings obtained from the initially proposed value-added services.

The **spending tracker** service has been chosen to be included in the subsequent quantitative analysis for two reasons. First, it was suggested by the highest number of participants as compared to other suggestions. Thus, it could potentially provide a good example of value-added services that positively affect m-payment adoption from a consumers' perspective. Second, spending tracking and budgeting services are already available in the UK through several dedicated apps, such as Money Dashboard and Moneyhub (Horne, 2019). By taking advantage of the open banking initiative, these apps allow users to manage their finances by aggregating data from multiple accounts into one place. Since the technology is already established, the spending tracker service has a strong potential to be integrated in future m-payment apps.

5.13 Discussion of the Qualitative Findings

The findings of the qualitative study have provided contextualised interpretations of the value components as well as other influential factors that affect consumers' intention to adopt m-payment. In addition, the findings have offered deep insights into the way consumers identify added value in the m-payment context. Table 5.3 provides an outline of the main domains of the initially proposed and newly emergent factors that have been identified based on the participants' views.

Table 5.3 Identified Domains of Factors

Factor	**Identified domain**
Convenience Value	Ubiquity of the mobile phone Saving time Saving effort
Monetary Value	Saving money Spending less Better management of expenses
Enjoyment Value	Satisfying experience Would make me feel good Would make me feel happy
Social Value	To look like others Enhance social interaction Establish social identity
Perceived Risk	Identity and sensitive information theft Privacy concerns Phone reliability and performance concerns
Trust in Provider	Ability to protect sensitive information Complies with security standards Offers competent and popular service Committed to resolving payment issues Awareness of consumer needs

Attractiveness of Alternatives	No need for a new payment method Convenience of other payment methods No additional benefit over other payment methods

5.13.1 Convenience Value

The qualitative findings suggest that convenience is a key component of m-payment value as perceived by participants, regardless of their previous m-payment experience. This agrees with previous research that confirmed the significant effect of convenience on m-payment behavioural intention (de Kerviler, *et al.*, 2016; Gao and Waechter, 2017). However, perceptions of convenience among the nonadopters were heavily influenced by their satisfactory experience with existing payment methods that seem to be blocking any need to switch to new methods. This finding was evident from the lack of information exhibited by many nonadopters about scenarios of use and merchant acceptance of m-payment apps as opposed to the adopters. In addition, nonadopters who recognised the convenience of m-payment have questioned the need for a new method that, at its best, matches the convenience of contactless cards without offering any tangible benefit. These findings suggest a salient negative effect of existing alternative payment methods on the perceived value of m-payment. Although previous studies confirmed the negative effect of attractiveness of alternatives on perceived value of other technologies (Lin, *et al.*, 2012), this factor has been largely overlooked in value-based m-payment adoption research. In terms of the effect of value-added services, the findings indicate that the added value perceived from m-payment augmentation was mainly recognised through utilitarian value components, i.e. convenience value and monetary value. Particularly, the added convenience value was perceived through the ability to achieve more with the m-payment app on top of a streamlined payment experience. Embedding more functionalities, such as the instant balance, loyalty card integration and spending tracker, into a frequently used payment app was seen as more time saving than accessing these services through separate channels. In addition, the suggested value-added services were perceived to be solving usability issues associated with the payment activity, such as the visibility of paid money and the inconvenience of handling multiple loyalty cards.

5.13.2 Monetary Value

In line with previous studies (Pura, 2005; Omigie, *et al.*, 2017), dichotomising functional value into convenience value and monetary value has proved to be important. Contrary to convenience, the findings suggest that m-payment does not provide any significant monetary value as perceived by participants because any difference in terms of cost and spending across all payment methods is invisible. Furthermore, the explanations that some adopters provided with regard to overspending indicate that they perceived the monetary value of m-payment negatively. Although some previous studies have operationalised convenience and economic benefits into a single ‘utilitarian value’ construct (Cocosila and Trabelsi, 2016), these findings further emphasise the difference between the

two concepts in the m-payment context. More interestingly, monetary value was only perceived from using the augmented m-payment service, either directly from earning cashback or indirectly from simplifying ways of budgeting, collecting loyalty points, or finding cashback deals. Since monetary value received no support in case of the sole m-payment service, this finding provides more evidence of the importance of differentiating between convenience and monetary value components in the m-payment context. Furthermore, based on this finding, this research contends that value-added services do not only enhance existing perceived value components of the core m-payment service, but also create new components based on the additional features.

5.13.3 Enjoyment Value

Enjoyment value was recognised by adopters and nonadopters, however, they placed less emphasis on its effect on m-payment value as compared to convenience. More specifically, enjoyment was mainly derived from convenience-related aspects rather than being a key determinant of m-payment adoption as indicated by previous studies (Cocosila and Trabelsi, 2016; de Kerviler, *et al.*, 2016). Similar to the case of m-payment as a sole service, perceptions of added enjoyment value from augmenting m-payment with value-added services was mainly derived from perceptions of added convenience. Additionally, the added monetary value has also led to positive emotional aspects among some participants. Although most participants did not explicitly mention enjoyment as an important value component, these findings suggest the presence of emotional aspects in the m-payment context. This could be attributed to the utilitarian nature of m-payment services. In this regard, participants emphasised the importance of functional utilities that m-payment services provide while perceiving the emotional aspect that results from m-payment as a whole experience.

5.13.4 Social Value

Previous m-payment adoption research has confirmed the significance of social value as an influential value component (Cocosila and Trabelsi, 2016; de Kerviler, *et al.*, 2016). In contrast, the qualitative findings of this research indicate a weak association between social value and m-payment behavioural intention among most of the participants. Although some participants believed that social value could have an influence if they were younger, other younger participants were hesitant to associate self-image gains from using m-payment. Similarly, no major changes were observed in participants' perceptions of social value after introducing m-payment value-added services. In comparison with other value components, participants appeared to be less encouraged to attach significant self-image gains from using m-payment regardless of the presence of any value-added services. This could be explained by the participants' perceptions of m-payment as a private financial matter. These findings also indicate a less predictive effect of social value on m-payment behavioural intention.

5.13.5 Perceived Risk

In accordance with previous research (Cocosila and Trabelsi, 2016; de Kerviler, *et al.*, 2016), perceived risks related to the phone as a device along with other general privacy concerns were found as a value-inhibiting factor that is mainly visible among nonadopters. Furthermore, the introduction of m-payment value-added services did not seem to reduce the perceived risks associated with m-payment among the participants. On the contrary, some participants perceived additional privacy concerns, as in the case of instant balance and loyalty card integration. This implies that value-added services are less likely to add value to m-payment through reducing the perceived associated risks as previously conceptualised (Ravald and Grönroos, 1996).

5.13.6 Trust in Provider

Many participants acknowledged that their perceptions of risk would diminish with trustworthy providers. In this context, they described trustworthy providers in terms of their ability to protect consumers' information and their commitment to resolving payment issues. Previous studies have confirmed this negative relationship between trust in provider and perceived risks in the context of e-commerce adoption (Pavlou, 2003) and m-payment adoption (Slade, Williams, *et al.*, 2015). Thus, the qualitative findings confirm the importance of trust in provider in decreasing perceived risk as a sacrifice component of value, which also implies increasing perceived m-payment value. The introduction of m-payment value-added services enhanced perceptions of trust among some of the participants. In this regard, they perceived that offering additional functionalities that simplify payment-related scenarios would reflect the provider's understanding of consumers' needs. Therefore, augmenting m-payment with value-added services may indirectly reduce perceptions of risk through enhancing perceptions of trust in provider.

5.13.7 Attractiveness of Alternatives

Along with perceived risk, the attractiveness of existing alternative payment methods has emerged as another barrier to m-payment adoption among the nonadopters. However, their narratives indicate that the negative effect of perceived risk appears to be less observed as compared to the effect of existing alternatives on m-payment value. This finding was evident in two aspects. First, from the willingness demonstrated by some nonadopters to 'mitigate' these risks should they perceive an additional benefit not offered by current payment methods. Second, by acknowledging the effectiveness of the extra security measures provided by the mobile phone, i.e. passcode and biometric authentication, in comparison to contactless cards in case of loss or theft. Thus, based on evidence provided by the qualitative data, the proposed research model will be extended with attractiveness of alternatives as detailed in the next section.

5.14 Extended Research Model

The findings discussed above have led to consideration of existing alternatives as a new factor that has impact on m-payment perceived value and behavioural intention. This section presents an extension of the proposed m-payment adoption model (see Chapter 3) by taking this new factor into account.

The literature suggests that the availability of attractive alternative services serve as a barrier to using newly emerging services (Jones, Mothersbaugh and Beatty, 2000). In this regard, Jones, Mothersbaugh and Beatty (2000) conceptualised 'attractiveness of alternatives' as the "customer perceptions regarding the extent to which viable competing alternatives are available in the marketplace". Different approaches have been followed to model attractiveness of alternatives in structural models. Whilst some researchers have included it as a direct antecedent of behavioural intentions (Pham and Ho, 2015; Xu, Peak and Prybutok, 2015), others have conceptualised it as an antecedent of perceived value (Lin, *et al.*, 2012; Hansen, Beitelspacher and Deitz, 2013). Researchers suggest that, when perceived value is modelled as the primary and direct predictor of behavioural intention as in the case of this study, attractiveness of alternatives should be modelled as an antecedent of perceived value (Lu, Tu and Jen, 2011). In the context of m-payment, previous research has confirmed a negative effect between attractiveness of alternatives and behavioural intention to use m-payment (Pham and Ho, 2015). In line with the findings of the qualitative analysis of this study, the negative effect of attractiveness of alternatives on perceived value has also been empirically confirmed by previous consumer behaviour research (Hansen, *et al.*, 2013). Furthermore, the findings suggest that the added value that some of the participants perceived from the suggested value-added services has negatively influenced their perceptions of the attractiveness of existing payment methods. This was evident from the willingness of such participants to switch to m-payment that offers their most preferred value-added service.

> "*If the new one had all the functionality that I currently use then I would perceive the new one to be better … with the extra services*" (Participant 7)
>
> "*that [m-payment with the preferred value-added service] is more valued than using my card*" (Participant 21)

Therefore, based on the above argument, the following new hypotheses are included into the extended research model:

H5: Attractiveness of Alternatives has a negative effect on the Perceived Value of m-payment.

H4c: Value-Added Service has a negative effect on Attractiveness of Alternatives

The findings also indicate that nonadopters' perceptions of m-payment value components were largely affected by their lack of knowledge about the process involved in conducting m-payments

from a consumer's perspective. This was evident from the sharp contrast between adopters and nonadopters in terms of perceiving the convenience and acceptance of m-payment at merchant outlets. Such difference would potentially introduce a nuisance variable that impacts the comparability of the experimental groups in the subsequent quantitative analysis (Keppel and Wickens, 2004). Furthermore, ignoring the heterogeneity of respondents can seriously bias and damage the validity of PLS-SEM results (Sarstedt, Henseler and Ringle, 2011; Hair, *et al.*, 2017). Therefore, to account for the observed heterogeneity that emerged as a result of lack of knowledge, the extended research model of Figure 5.1 will be assessed separately for adopters and nonadopters. For this purpose, a post-hoc blocking approach (Keppel and Wickens, 2004) will be used to segregate respondents into homogenous groups based on their previous m-payment experience. In this approach, the segregation takes place after the data collection, meaning that the randomisation procedure is not affected. Evaluating the model separately implies that the minimum sample size requirement has to be met for both the adopters and nonadopters. This will be discussed in more detail in section 5.16.

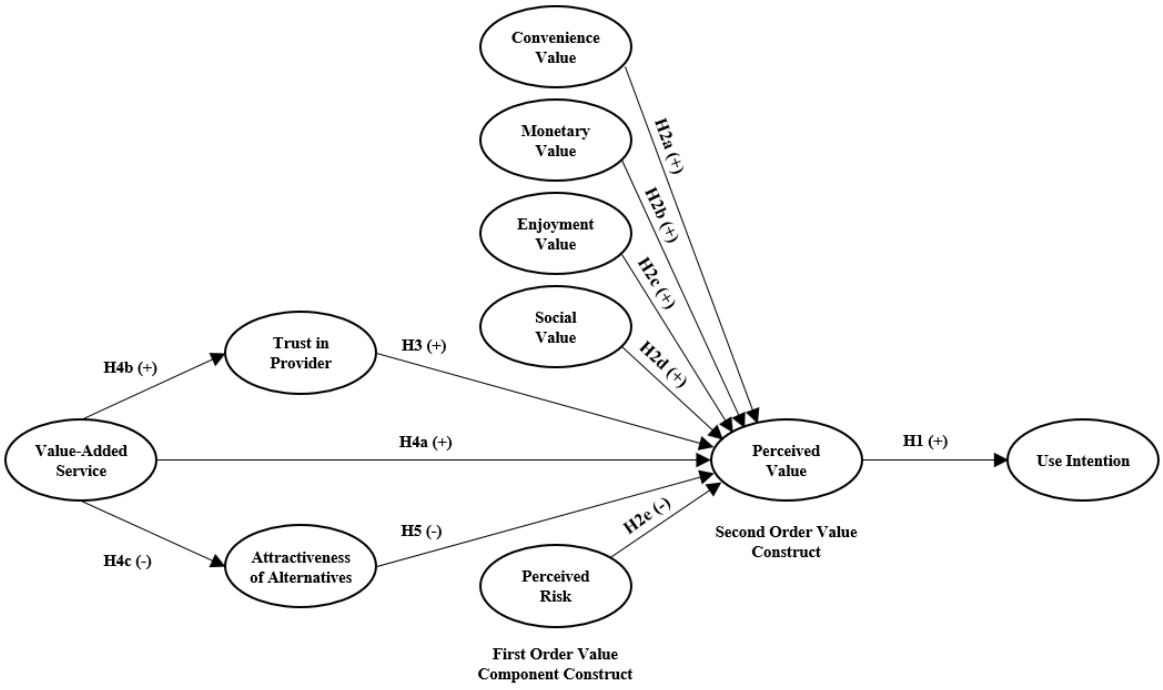

Figure 5.1 The Extended Research Model

5.15 Development of Measurement Items

The development of the survey measurement items was based on the literature review and the qualitative findings. Specifically, the measurement items were selected from previous studies based on their consistency with the participants' identified factor domains (Table 5.3). The aim of this process was twofold: (1) to select the items that best reflect the constructs in the m-payment context as perceived by the participants; and (2) to ensure that the items had been validated by previous

studies. Following the review and pre-test of the selected items discussed in the previous chapter, minor changes have been made to the wording of the items to be suitable for adopters and nonadopters. The final list of the selected items along with their sources is outlined in Table 5.4. A total of 35 items have been selected: five items (CON1-CON5) to measure convenience value, four items (MON1-MON4) to measure monetary value, four items (SOC1-SOC4) to measure social value, three items (ENJ1-ENJ3) to measure enjoyment value, seven items (RSK1-RSK7) to measure perceived risk, five items (TRU1-TRU5) to measure trust in provider, four items (ALT1-ALT4) to measure attractiveness of alternatives, and three items (UI1-UI3) to measure m-payment use intention. It should be noted that the measurement model of all constructs in the research model is reflective except for perceived value, which has a formative measurement model, as discussed earlier in section 2.9.3. The difference between reflective and formative measurement models will be discussed in detail in the next chapter.

Table 5.4 Measurement Items of Model's Constructs

Item	Source
Convenience Value	
CON1: Mobile payment is convenient because the phone is usually with me	(Kim, *et al.*, 2010)
CON2: Mobile payment is convenient because I can use it anytime	
CON3: Using mobile payment is convenient because it would save me time	(Gupta and Kim, 2010)
CON4: Mobile payment is convenient because it would minimise my effort	(Gupta and Kim, 2010)
CON5: Compared to traditional payment methods, mobile payment is more convenient	(Chen, 2008)
Monetary Value	
MON1: Using mobile payment would help me to do my shopping at a lower financial cost	(de Kerviler, *et al.*, 2016)
MON2: Using mobile payment would help me to save money	
MON3: Using mobile payment would help me to spend less	(Mimouni-Chaabane and Volle, 2010)
MON4: Using mobile payment would help me to better manage my expenses	(Cocosila and Trabelsi, 2016)
Social Value	
SOC1: Using mobile payment would help me to feel acceptable among my friends	(Sweeney and Soutar, 2001; Cocosila and Trabelsi, 2016)
SOC2: Using mobile payment would improve the way I am perceived by my peers	
SOC3: The fact I use mobile payment would make a good impression on other people	
SOC4: Using mobile payment would give me social approval	
Enjoyment Value	
ENJ1: Using mobile payment would make me feel good	(Sweeney and Soutar, 2001)
ENJ2: I would feel relaxed about using mobile payment	
ENJ3: I would enjoy using mobile payment	
Perceived Risk	

RSK1: I do not feel totally safe providing personal private information over mobile payment apps	(Slade, Williams, *et al.*, 2015)
RSK2: I am worried about using mobile payment apps because other people may be able to access my account	
RSK3: Using a mobile payment app would lead to a loss of privacy for me because my personal information would be used without my knowledge	(Featherman & Pavlou, 2003)
RSK4: The mobile payment app might not perform well and create problems with my payments	(Featherman & Pavlou, 2003)
RSK5: The likelihood that there will be something wrong with the performance of the mobile payment app or that it will not work properly is high	(Featherman & Pavlou, 2003)
RSK6: The security measures built into mobile payment apps are not strong enough to protect my finances	(Slade, Williams, *et al.*, 2015)
RSK7: I believe that overall riskiness of mobile payment apps is high	(Slade, Williams, *et al.*, 2015)
Trust in Provider	
TRU1: I believe mobile payment service providers keep their promise	(Slade, Williams, *et al.*, 2015)
TRU2: I believe mobile payment service providers keep customers' interests in mind	
TRU3: The services offered by mobile payment service providers meet my needs	(Lee, *et al.*, 2007)
TRU4: I believe mobile payment service providers will do everything to secure the transactions for users	(Slade, Williams, *et al.*, 2015)
TRU5: I believe mobile payment service providers are trustworthy	(Slade, Williams, *et al.*, 2015)
Attractiveness of Alternatives	
ALT1: Compared to mobile payments, there are other payment methods (cards, cash, etc.) with which I would probably be equally or more satisfied	(Jones, *et al.*, 2000)
ALT2: An alternative payment method (cards, cash, etc.) is more convenient than mobile payments	(Xu, *et al.*, 2015)
ALT3: My needs could easily be fulfilled by an alternative payment method	(Xu, *et al.*, 2015)
ALT4: To my knowledge, another payment method is close to ideal	(Xu, *et al.*, 2015)
Use Intention	
UI1: Assuming that I had access to mobile payment, I would intend to use it	(Cocosila and Trabelsi, 2016)
UI2: Given that I had access to mobile payment, I predict that I would use it	
UI3: Given a chance, I plan to use mobile payment in the future	(Kim, *et al.*, 2007)

5.16 Sample Size Adjustment

As discussed in the previous chapter (section 4.5.4), the sample size for the quantitative study was calculated based on a statistical power analysis that takes into consideration, among other parameters, the maximum number of arrows pointing to a construct in the model. In the extended model, the maximum number of arrows has changed to eight following the inclusion of attractiveness of alternatives construct. As a result, the minimum sample size as obtained from Hair *et al.*'s (2017)

lookup table and G*Power software is 144 for each group. Furthermore, the addition of the participants' proposed value-added service (spending tracker) brings the total number of control and experimental groups to five. By taking into consideration that the data will be analysed separately for adopters and nonadopters, the final minimum sample size is 144*5*2=1440.

5.17 Summary

This chapter has provided an in-depth analysis of the qualitative data obtained from the interviews. The data were analysed through the lens of the initial proposed conceptual model that extends the perceived value theory with trust in provider as determinants of m-payment adoption intention. The findings revealed that perceptions of m-payment value as a sole service were mainly interpreted in terms of convenience-related aspects. In terms of barriers to adoption, attractiveness of alternatives has emerged as a new factor that acts as a significant m-payment value-inhibitor among the nonadopters. The added value that was perceived as a result of introducing value-added services was predominantly based on convenience and monetary value components along with enhanced perceptions of trust. Furthermore, perceptions of alternative payment methods' attractiveness were reduced as a result of the perceived added value. Based on these findings, this chapter has presented an extension to the proposed research model in order to include attractiveness of alternatives as a new influential construct in the m-payment context. Finally, the selection of the measurement items of the model's constructs along with the adjustment of the minimum sample size have been discussed to be employed in the quantitative study in the next chapter.

Chapter 6 Quantitative Data Analysis and Research Model Evaluation

6.1 Overview

This chapter presents a quantitative analysis for the data obtained from the survey experiment. As discussed in Chapter 4, PLS-SEM will be employed to test the proposed hypotheses of this study in two steps. In the first step, the measurement indicators will be assessed in order to confirm their reliability and validity to represent the underlying constructs. This also involves specifying the higher order construct of perceived value and assessing the validity of its lower order components. In the second step, the structural model will be assessed in terms of its hypothesised relationships and predictive power.

The chapter is organised as follows. Section 6.2 describes the data screening procedure and the resulting sample. Section 6.3 introduces the measurement model assessment step and outlines the criteria used to evaluate the different types of measurement models. In section 6.4, the data preparation procedure used for experimental manipulation assessment is described. Section 6.5 specifies the approach used to model the higher order construct. The reflective and formative models' assessment results are presented in sections 6.6 and 6.7 respectively. Section 6.8 presents the structural model assessment results in terms of the study hypotheses and the predictive power of the proposed model. In section 6.9, the quantitative results are discussed and compared against the findings of the qualitative phase as well as previous research. The chapter concludes with a summary of the main findings in section 6.10.

6.2 Sample Screening and Descriptive Statistics

As discussed in the previous chapter, the minimum sample size required to assess the extended research model across all groups for adopters and nonadopters is 1440. To account for any potential deficits that may occur as a result of randomisation or invalid responses, a total of 1750 respondents were recruited through Prolific between 15 May and 14 June 2019. The sample screening process involved identifying observations with missing data, unengaged straight-line responses, and inconsistent answers as per the guidelines outlined by Hair *et al.* (2017). These criteria were adopted in the following manner:

- **Missing data:** this criterion occurs when a respondent leaves one or more questions unanswered. Although missing data was controlled at the survey administration level by making all survey questions mandatory, 37 respondents (2.1%) failed to complete all the questionnaire items.
- **Straight lining:** this criterion refers to a type of outliers in which the respondent gives the same response for a high proportion of the questions. The straight lining criterion was applied

to the measurement items that use the seven-point Likert scale. To account for straight lining, the standard deviation of the measurement items for each respondent was calculated. Respondents with a standard deviation of zero were marked as straight-liners. A total of 4 (0.2%) respondents were found as straight-liners.

- **Inconsistent answers:** this occurs when respondents provide different answers to questions addressing the same criterion. In this survey, three screening questions were used to indicate the respondent's previous m-payment use experience in terms of period of use, frequency of use, and number of times used in the last year. For example, a respondent who indicated that s/he 'never' used m-payment in the past in response to the period of use question and answered 'once per week' in response to the frequency of use question was marked as inconsistent. A total of 7 (0.9%) respondents were found to have provided inconsistent answers to the screening questions.

Based on the above screening criteria, a total of 56 (3.2%) invalid responses were identified. These invalid responses were discarded because the valid remaining responses were sufficient to meet minimum required sample size (Hair, *et al.*, 2014). The total number of the final valid responses is 1694. The descriptive statistics of the respondents with valid responses are shown in Table 6.1 and Table 6.2 for nonadopters and adopters respectively. The tables list the respondents assigned to the control group (VAS0) and to the experimental groups of each of the suggested value-added services, namely instant balance (VAS1), loyalty card integration (VAS2), spending tracker (VAS3), and cashback (VAS4). The sample size for each group exceeds the minimum sample size of 144 as specified earlier. The segregation of nonadopters and adopters was based on previous m-payment experience measurement scale, where nonadopters were those who indicated that they never used m-payment in the past.

Table 6.1 Descriptive Statistics of Nonadopters

Demographic	Classification Group	VAS0		VAS1		VAS2		VAS3		VAS4	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Age	18-24	18	9.4	17	8.6	16	9.3	14	8.0	11	6.8
	25-34	58	30.4	50	25.4	41	23.8	44	25.1	47	29.2
	35-44	52	27.2	44	22.3	44	25.6	41	23.4	40	24.8
	45-54	24	12.6	46	23.4	35	20.3	40	22.9	33	20.5
	55-64	28	14.7	28	14.2	23	13.4	28	16.0	20	12.4
	65+	11	5.8	12	6.1	13	7.6	8	4.6	10	6.2
Gender	Female	107	56.0	107	54.3	94	54.7	86	49.1	81	50.3
	Male	84	44.0	90	45.7	78	45.3	89	50.9	80	49.7
Occupation	Employed	95	49.7	109	55.3	81	47.1	99	56.6	90	55.9
	Self-employed	27	14.1	20	10.2	31	18.0	22	12.6	24	14.9
	Student	10	5.2	6	3.0	13	7.6	8	4.6	6	3.7
	Pensioner	18	9.4	14	7.1	12	7.0	14	8.0	12	7.5
	Unemployed	41	21.5	48	24.4	35	20.3	32	18.3	29	18.0

Education	Undergraduate degree (BA/BSc/etc.)	54	28.3	49	24.9	41	23.8	42	24.0	42	26.1
	College/A Levels	58	30.4	55	27.9	55	32.0	55	31.4	39	24.2
	Secondary school/GCSE	40	20.9	37	18.8	30	17.4	36	20.6	36	22.4
	Graduate degree (MA/MSc/MPhil/etc.)	34	17.8	50	25.4	37	21.5	35	20.0	39	24.2
	Doctorate degree (PhD/MD/etc.)	2	1.0	6	3.0	7	4.1	5	2.9	4	2.5
	No formal qualification	3	1.6	0	0	2	1.2	2	1.1	1	0.6
Total sample size (896)		**191**		**197**		**172**		**175**		**161**	

Table 6.2 Descriptive Statistics of Adopters

Demographic	**Group**	**VAS0**		**VAS1**		**VAS2**		**VAS3**		**VAS4**	
		Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Age	18-24	26	16.8	31	20.3	38	22.6	36	22.0	27	17.1
	25-34	51	32.9	65	42.5	65	38.7	58	35.4	66	41.8
	35-44	38	24.5	38	24.8	37	22.0	37	22.6	36	22.8
	45-54	26	16.8	13	8.5	17	10.1	15	9.1	21	13.3
	55-64	8	5.2	6	3.9	10	6.0	16	9.8	6	3.8
	65+	6	3.9	0	0	1	0.6	2	1.2	2	1.3
Gender	Female	67	43.2	67	43.8	76	45.2	76	46.3	69	43.7
	Male	88	56.8	86	56.2	92	54.8	88	53.7	89	56.3
Occupation	Employed	109	70.3	99	64.7	114	67.9	106	64.6	116	73.4
	Self-employed	12	7.7	14	9.2	14	8.3	15	9.1	12	7.6
	Student	16	10.3	26	17.0	16	9.5	22	13.4	18	11.4
	Pensioner	4	2.6	0	0	3	1.8	8	4.9	5	3.2
	Unemployed	14	9.0	14	9.2	21	12.5	13	7.9	7	4.4
Education	Undergraduate degree (BA/BSc/etc.)	43	27.7	51	33.3	52	31.0	40	24.4	42	26.6
	College/A Levels	38	24.5	47	30.7	46	27.4	52	31.7	53	33.5
	Secondary school/GCSE	30	19.4	22	14.4	25	14.9	24	14.6	22	13.9
	Graduate degree (MA/MSc/Mphil/etc.)	41	26.5	28	18.3	41	24.4	41	25.0	37	23.4
	Doctorate degree (PhD/MD/etc.)	3	1.9	5	3.3	4	2.4	5	3.0	4	2.5
	No formal qualification	0	0	0	0	0	0	2	1.2	0	0
Total sample size (798)		**155**		**153**		**168**		**164**		**158**	

The sample reflects a slightly higher number of nonadopters (896) constituting 52.9% as compared to adopters (798) comprising 47.1% of the sample. In terms of demographics, the age group 25-34 constituted the highest number of participants for both the nonadopters (26.7%) and adopters (38.2%). On the other hand, female participants comprised 53% of the nonadopters, whereas 55.5% of adopters were males. For both nonadopters and adopters, employed participants comprised the highest number in terms of occupation, with 52.9% and 68.1% respectively. Finally, participants

with College/A Levels education comprised the highest number of participants for both the nonadopters (29.2%) and adopters (29.5%).

6.3 Measurement Model Assessment

The first step in evaluating structural models using partial least squares structural equation modelling (PLS-SEM) involves assessing the measurement model (Chin, 2010; Hair, *et al.*, 2019). The main aim of this step is to ensure that the measurement items truly represent the constructs of interest (Hair, Ringle and Sarstedt, 2011). The measurement model represents the relationship between the latent variables (constructs) and the indicators (measurement items) (Hair, *et al.*, 2017). Latent variables are abstract theoretical concepts that are not directly measured. Instead, structural equation modelling (SEM) measures these concepts indirectly through their measurement model which is composed of multiple indicators obtained via data collection (Hair, *et al.*, 2014). This process is implemented in the PLS-SEM algorithm, which is the core component of SmartPLS software used in this study (see subsection 4.5.7). Using an iterative process, the PLS-SEM algorithm combines the data collected for the indicators to estimate the construct scores that they represent (Hair, *et al.*, 2017). Subsequently, the algorithm uses these scores to estimate the structural model relationships. During this process, the algorithm also calculates other model parameters, including indicator loadings and weights, composite reliability (CR), average variance extracted (AVE), Cronbach's alpha (CA) and coefficient of determination for each dependent construct. More detail will be provided on these parameters in the following sections.

Different criteria are involved in the measurement model assessment based on whether the model is reflective or formative. Since the research model of this study includes reflective and formative measurement models, it is essential to understand their conceptual difference before assessing their validity. Chin (1998) explains the difference between reflective and formative models within the context of PLS-SEM as follows:

- **Reflective model (Mode A):** the indicators under this model are created based on the fact that they all measure the same concept. A change in the magnitude at the conceptual level is reflected on all the indicators in the same direction, meaning that the indicators are highly correlated and interchangeable (Jarvis, MacKenzie and Podsakoff, 2003). This also implies that the direction of causality is from the concept (latent variable) to the indicators, i.e. the arrows' direction is pointing from the latent variable to the indicators.
- **Formative model (Mode B):** the indicators in this model are not assumed to be measuring the same concept and may not be correlated. Instead, the indicators are considered as the cause variables that provide the condition under which the concept is formed. In this sense, each indicator represents a specific aspect of the concept's domain (Jarvis, *et al.*, 2003; Hair,

et al., 2017). The arrows direction of this model is pointing from the indicators to the latent variable.

The choice of a reflective or formative measurement model for a given construct is based on pre-established theoretical assumptions (Cenfetelli and Bassellier, 2009). Based on the literature review conducted across the previous chapters, the following constructs were specified as reflective: trust in provider, attractiveness of alternatives, convenience value, monetary value, enjoyment value, social value, perceived risk, and use intention. On the other hand, the measurement model of the second order construct (perceived value) is formative. Therefore, the perceived value construct will be specified as a reflective-formative higher order construct. The criteria used for reflective measurement model assessment include internal consistency, convergent validity, and discriminant validity. The formative measurement model assessment criteria include convergent validity, collinearity of indicators and significance and relevance of the outer weights. Table 6.3 summarises each criterion along with the corresponding rule of thumb as recommended by Hair, *et al.* (2017).

Table 6.3 Measurement Assessment Criteria

<table>
<tr><th colspan="2">Reflective measurement model</th><th colspan="2">Formative measurement model</th></tr>
<tr><th>Criteria</th><th>Rule of thumb</th><th>Criteria</th><th>Rule of thumb</th></tr>
<tr><td rowspan="2">Internal consistency</td><td>Cronbach's alpha (CA) > 0.70</td><td rowspan="2">Convergent validity</td><td rowspan="2">The correlation between the formative construct and an alternative reflective construct ≥ 0.70</td></tr>
<tr><td>Composite reliability (CR) > 0.70</td></tr>
<tr><td rowspan="2">Convergent validity</td><td rowspan="2">Indicator's outer loading > 0.70</td><td>Collinearity of indicators</td><td>Variance inflation factor (VIF) for each indicator (VIF) < 5</td></tr>
<tr><td rowspan="2">Significance and relevance of the outer weights</td><td rowspan="2">Retain indicator if:
1. The indicator's weight is significant
or
2. The indicator's weight is nonsignificant, but the corresponding item loading is significant</td></tr>
<tr><td>Average variance extracted (AVE) > 0.50</td></tr>
<tr><td>Discriminant validity</td><td>Heterotrait-monotrait (HTMT) ratio ≤ 0.85</td></tr>
</table>

6.4 Experimental Manipulation Assessment

To assess the experimental manipulation effect in the extended research model of Figure 5.1, the collected data has been grouped into eight datasets for analysis as shown in Table 6.4. Each dataset includes the observations of the control group (the reference group) and one of the suggested value-added services experimental groups. To differentiate each group within datasets, a dichotomous categorical variable, named 'GROUP', has been used with a value of '0' for the control group and

'1' for the experimental group. Dichotomous categorical variables have been used by previous studies to analyse experimental effects using PLS-SEM (Streukens, *et al.*, 2010; Doucé, *et al.*, 2016; Andrei, *et al.*, 2017). The 'GROUP' variable will be used as an indicator for the value-added service construct in the structural model. In the table below, CVAS1-4 denote a combined dataset of the control group and the experimental group of one of the suggested value-added services 1-4.

Table 6.4 Combined Datasets

Dataset	Number of observations (nonadopters)			Number of observations (adopters)		
	Control group	Experiment group	Total	Control group	Experiment group	Total
CVAS1	191	197	388	155	153	308
CVAS2	191	172	363	155	168	323
CVAS3	191	175	366	155	164	319
CVAS4	191	161	352	155	158	313

6.5 Second Order Construct Specification

Before proceeding with the measurement model assessment, special consideration is needed if the structural model includes a higher order construct. As discussed earlier, perceived value is modelled as a second order construct that has no directly measured indicators. However, PLS-SEM requires the measurement indicators to estimate the underlying construct score (Becker, Klein and Wetzels, 2012). To resolve this issue, two approaches have been suggested to specify higher order constructs: the repeated indicators approach and the two-stage approach (Ringle, *et al.*, 2012). The repeated indicators approach involves assigning all the indicators of the underlying lower order constructs to the higher order construct (Becker, *et al.*, 2012). The two-stage approach estimates the lower order constructs' scores using a model that does not include the higher order construct in the first stage. Instead, the lower order constructs are directly linked to all other constructs in the model to which the higher-order construct is theoretically related (Sarstedt, *et al.*, 2019). In the second stage, the lower order constructs' scores estimated in the first stage are saved and used as indicators for the higher order construct (Becker, *et al.*, 2012). In a simulation study that compared the two approaches, Becker, Klein and Wetzels (2012) have demonstrated that the two-stage approach produces less biased path coefficient estimates for the structural model relationships pointing to and from the higher order construct. On this basis, researchers recommend that the two-stage approach should be used when the focus is on minimising the parameter bias in the structural model relationships (Sarstedt, *et al.*, 2019). The current study is mainly focused on investigating the effect of value-added services on perceived value as a higher order construct along with trust in provider and attractiveness of alternatives as influential factors in the context of m-payment adoption. Since such an effect is measured through estimating structural model relationships, the two-stage approach is deemed suitable to minimise any potential bias.

6.6 Reflective Measurement Model Assessment

According to the detailed guidelines outlined by Sarstedt *et al.* (2019) for reflective-formative higher order constructs, the reflective measurement model assessment will be conducted in stage-one. This is because the model in the first stage includes reflective constructs only as illustrated in Figure 6.1. Referring to the extended research model of Figure 5.1, the second order perceived value construct is replaced by its lower order constructs. In addition, the same structural model relationships to and from perceived value are applied to each of its first order components.

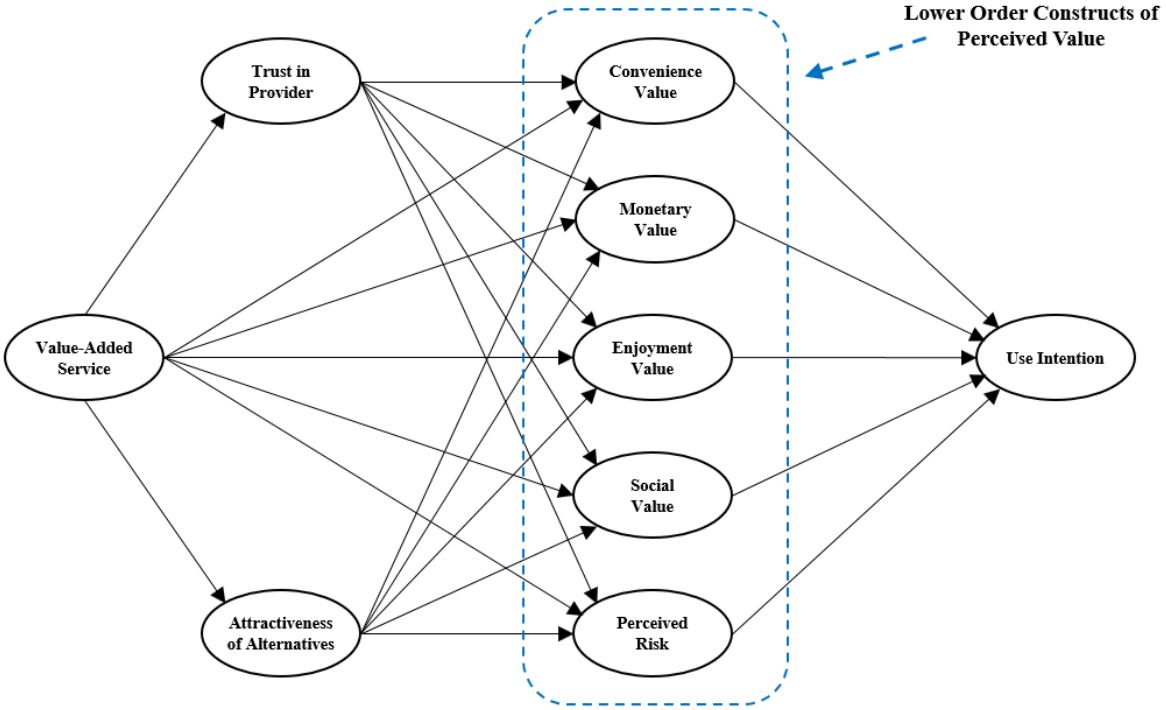

Figure 6.1 Stage-One Research Model

Based on the criteria outlined in Table 6.3, the following subsections will assess internal consistency, convergent validity and discriminant validity of the reflective constructs of the model shown in Figure 6.1. As explained earlier, the value-added service is a single-item construct that has one indicator (GROUP). In PLS-SEM, a single-item construct is equal to its indicator, meaning that the indicator loading is always one (Hair, *et al.*, 2017). Therefore, consistency and validity assessments for the value-added service construct are irrelevant and will not be reported.

6.6.1 Internal Consistency

Internal consistency involves evaluating the reliability of reflective measurement models. Assessing the reliability of reflective indicators is essential to avoid potential biased estimates in the structural model (Hair, *et al.*, 2012). Reflective measurement model reliability refers to the degree at which a set of indicators are interrelated and measure the same latent construct (Hair, *et al.*, 2014). The assessment of internal consistency reliability of reflective constructs involves evaluating two

measures: Cronbach's alpha (CA) and composite reliability (CR) (Henseler, Ringle and Sinkovics, 2009; Hair, *et al.*, 2017). Although the recommended threshold for both criteria is 0.7, the actual reliability estimate will be between CA as the lower bound and CR as the upper bound due to differences between the way each measure is calculated (Hair, *et al.*, 2017). The PLS-SEM algorithm results for CA and CR estimations across nonadopters and adopters' datasets are listed in Table 6.5. Whilst the CA values range from 0.731 to 0.966, the CR values range from 0.835 to 0.978. These values provide evidence of high construct reliability across all datasets.

Table 6.5 Construct Internal Consistency and Validity of Combined Datasets

Construct	Nonadopters											
	CVAS1			CVAS2			CVAS3			CVAS4		
	CA	CR	AVE	CA	CR	AVE	CA	CR	AVE	CA	CR	AVE
ALT	0.746	0.835	0.559	0.777	0.854	0.594	0.777	0.854	0.594	0.758	0.842	0.573
CON	0.894	0.922	0.703	0.902	0.927	0.718	0.886	0.916	0.688	0.907	0.931	0.729
ENJ	0.914	0.946	0.853	0.907	0.942	0.844	0.899	0.937	0.831	0.912	0.944	0.850
MON	0.904	0.933	0.777	0.913	0.939	0.796	0.925	0.947	0.818	0.894	0.927	0.763
RSK	0.901	0.922	0.629	0.907	0.926	0.642	0.901	0.922	0.630	0.905	0.925	0.640
SOC	0.932	0.951	0.830	0.941	0.958	0.849	0.937	0.955	0.841	0.930	0.950	0.826
TRU	0.855	0.895	0.632	0.862	0.900	0.644	0.833	0.882	0.599	0.854	0.895	0.632
UI	0.960	0.974	0.927	0.966	0.978	0.937	0.964	0.977	0.933	0.962	0.975	0.930
Construct	Adopters											
	CVAS1			CVAS2			CVAS3			CVAS4		
	CA	CR	AVE	CA	CR	AVE	CA	CR	AVE	CA	CR	AVE
ALT	0.830	0.886	0.660	0.811	0.874	0.636	0.819	0.879	0.645	0.787	0.858	0.602
CON	0.855	0.896	0.634	0.871	0.906	0.660	0.829	0.879	0.594	0.862	0.901	0.645
ENJ	0.731	0.847	0.650	0.739	0.849	0.655	0.740	0.852	0.658	0.744	0.853	0.660
MON	0.884	0.920	0.743	0.896	0.928	0.765	0.907	0.935	0.784	0.883	0.917	0.738
RSK	0.904	0.924	0.635	0.889	0.914	0.603	0.896	0.919	0.618	0.902	0.923	0.631
SOC	0.938	0.955	0.842	0.925	0.947	0.817	0.933	0.952	0.831	0.924	0.946	0.813
TRU	0.815	0.871	0.575	0.843	0.888	0.615	0.829	0.880	0.595	0.853	0.895	0.630
UI	0.932	0.956	0.880	0.942	0.963	0.896	0.939	0.961	0.891	0.946	0.965	0.902

ALT: Attractiveness of Alternatives, CON: Convenience Value, ENJ: Enjoyment Value, MON: Monetary Value, RSK: Perceived Risk, SOC: Social Value, TRU: Trust in Provider, UI: Use Intention, CA: Cronbach's Alpha, CR: Composite Reliability, AVE: Average Variance Extracted

6.6.2 Convergent Validity

Convergent validity refers to the positive correlation between the alternative indicators of the same construct (Hair, *et al.*, 2017). Evaluating convergent validity involves assessing two criteria: indicator reliability and average variance extracted (AVE). Indicator reliability is the degree of correlation between an indicator and its underlying construct. Researchers suggest that a reflective construct should exhibit a high correlation with each of its indicator variables to signify that these indicators represent the same construct (Henseler, *et al.*, 2009). The correlation is measured in terms of the absolute standardised indicator outer loading, where the outer loading should be higher than

0.7 (Hair, *et al.*, 2017). Table 6.6 outlines the PLS-SEM algorithm results of the indicators' outer loadings for each dataset. Loadings highlighted in boldface have failed to achieve the recommended 0.7 threshold. However, researchers suggest that indicators with loadings between 0.4 and 0.7 should only be removed from the measurement model if deleting them leads to an increase in the corresponding construct's CR above the recommended threshold (Hair, *et al.*, 2011). As illustrated in the previous section, the recommended CR threshold has already been achieved for all constructs across all datasets. Therefore, indicators with low loadings have been retained.

The AVE criterion refers to the average amount of the indicators' variance explained by their latent construct (Hair, *et al.*, 2011). A construct's AVE is measured by calculating the mean of squared outer loadings of its indicators, where an AVE value of 0.5 indicates that the construct explains an average of 50% of its indicators' variance (Hair, *et al.*, 2017). As previously shown in Table 6.5, all constructs across all datasets have exceeded the recommended minimum AVE threshold of 0.5, thus providing an evidence of convergent validity.

Table 6.6 Indicators Outer Loadings of Combined Datasets

Indicator	Outer loadings (Nonadopters)				Outer loadings (Adopters)			
	CVAS1	CVAS2	CVAS3	CVAS4	CVAS1	CVAS2	CVAS3	CVAS4
CON1	0.778	0.816	0.732	0.805	0.759	0.751	**0.684**	0.740
CON2	0.809	0.811	0.765	0.815	0.754	0.773	0.754	0.778
CON3	0.880	0.851	0.876	0.881	0.861	0.845	0.802	0.841
CON4	0.878	0.877	0.883	0.883	0.761	0.837	0.778	0.815
CON5	0.844	0.881	0.880	0.881	0.839	0.851	0.829	0.836
MON1	0.856	0.901	0.868	0.900	0.831	0.897	0.849	0.924
MON2	0.927	0.950	0.949	0.933	0.923	0.935	0.940	0.945
MON3	0.905	0.911	0.942	0.884	0.888	0.909	0.921	0.864
MON4	0.834	0.800	0.854	0.768	0.800	0.745	0.827	**0.678**
SOC1	0.884	0.888	0.890	0.891	0.870	0.885	0.901	0.867
SOC2	0.930	0.927	0.928	0.928	0.935	0.916	0.927	0.920
SOC3	0.908	0.929	0.923	0.906	0.927	0.902	0.914	0.911
SOC4	0.922	0.942	0.926	0.911	0.936	0.911	0.904	0.908
ENJ1	0.901	0.897	0.886	0.898	0.727	**0.684**	0.728	0.733
ENJ2	0.930	0.918	0.913	0.926	0.833	0.863	0.830	0.816
ENJ3	0.940	0.939	0.936	0.941	0.853	0.867	0.869	0.881
TRU1	0.789	0.795	0.749	0.803	0.775	0.788	0.780	0.814
TRU2	0.738	0.775	0.764	0.756	0.744	0.745	0.761	0.763
TRU3	0.771	0.775	0.721	0.753	0.733	0.723	**0.693**	0.766
TRU4	0.807	0.795	0.777	0.785	0.747	0.807	0.790	0.789
TRU5	0.864	0.869	0.853	0.873	0.791	0.851	0.825	0.834

RSK1	0.820	0.793	0.797	0.784	0.766	0.772	0.774	0.778
RSK2	0.802	0.820	0.829	0.822	0.828	0.820	0.823	0.835
RSK3	0.817	0.817	0.775	0.830	0.813	0.832	0.833	0.849
RSK4	**0.683**	0.727	0.702	**0.669**	**0.685**	**0.616**	0.705	**0.697**
RSK5	0.709	0.759	0.738	0.747	0.795	0.750	0.763	0.760
RSK6	0.832	0.837	0.813	0.833	0.827	0.827	0.780	0.773
RSK7	0.873	0.845	0.888	0.894	0.853	0.798	0.816	0.856
ALT1	0.748	0.754	0.761	0.725	0.856	0.859	0.839	0.830
ALT2	0.784	0.817	0.804	0.808	0.831	0.826	0.821	0.826
ALT3	0.712	0.736	0.739	**0.696**	0.744	0.747	0.768	0.708
ALT4	0.744	0.775	0.777	0.793	0.815	0.753	0.784	0.732
UI1	0.966	0.973	0.971	0.969	0.945	0.957	0.947	0.959
UI2	0.974	0.978	0.976	0.974	0.951	0.954	0.958	0.959
UI3	0.948	0.953	0.951	0.950	0.917	0.929	0.926	0.931

6.6.3 Discriminant Validity

Discriminant validity refers to the degree at which a construct is distinct from other constructs in the model in terms of how it correlates with other constructs and with its indicators (Hair, *et al.*, 2014). A distinct construct implies that it captures a unique concept that is not represented by other constructs in the same model (Hair, *et al.*, 2017). Lack of discriminant validity leads to uncertain results with regard to the hypothesised structural paths (Farrell, 2010). Three approaches have been suggested to evaluate discriminant validity: indicator cross-loadings, Fornell-Larcker criterion, and heterotrait-monotrait ratio (HTMT). Henseler, *et al.* (2015) have illustrated that cross-loadings and Fornell-Larcker approaches were unable to detect discriminant validity issues under situations where the model includes perfectly correlated constructs or indicators with convergent outer loadings. As a solution, the authors have shown that the HTMT approach outperforms the other approaches in detecting discriminant validity under similar conditions. Therefore, the HTMT approach was used in this study to evaluate discriminant validity as recommended by previous research (Franke and Sarstedt, 2019; Hair, *et al.*, 2019).

The HTMT approach evaluates discriminant validity for a given construct by assessing the ratio of the correlations of indicators across different constructs in the model relative to the correlations of indictors of the same given construct (Henseler, *et al.*, 2015). The smaller the HTMT ratio, the larger the correlations between the indicators of the same construct. A smaller HTMT ratio indicates the uniqueness of the underlying concept that the construct represents (Henseler, *et al.*, 2015). As a criterion to assess discriminant validity, Henseler, *et al.* (2015) suggested a threshold of 0.85 for models that include conceptually different constructs and 0.90 for conceptually similar constructs. For this study, discriminant validity has been assessed for the eight datasets. All constructs across

the eight datasets have exhibited a discriminant validity as evidenced by an HTMT ratio below the strict 0.85 threshold, ranging from 0.016 to 0.840. The PLS-SEM algorithm results of HTMT assessment are provided in Appendix 6.1.

Based on the above analysis and evaluation, all reliability and validity criteria for the reflective constructs have been met for all datasets. This leads to assessment of the measurement model for the higher order construct, which is presented in the following section.

6.7 Formative Measurement Model Assessment

According to the criteria outlined in Table 6.3, the following subsections will assess convergent validity of the second order formative construct as well as collinearity and significance of its indicators. As discussed earlier, the formative indicators represent the construct scores of convenience value, monetary value, enjoyment value, social value, and perceived risk. These were estimated in stage-one and saved to the corresponding dataset in the following new variables: CON, MON, ENJ, SOC, and RSK.

6.7.1 Convergent Validity of the Second Order Construct

Convergent validity of formative constructs is assessed through a redundancy analysis (Chin, 1998; Hair, *et al.*, 2017). Redundancy analysis involves evaluating the correlation between a formative construct and a reflective construct that measures the same concept with different indicators. A high correlation indicates that the combined formative indicators adequately represent the concept of interest (Cheah, *et al.*, 2018). In this study, three additional items adapted from previous studies were included in the data collection for all respondents to measure the redundant reflective perceived value construct as shown in Table 6.7. The correlation is evaluated by assessing the path coefficient (β) between the formative and reflective (denoted by PVR) constructs of perceived value as specified in the model shown in Figure 6.2. By running the PLS-SEM algorithm, the estimated path coefficient of the eight combined datasets are presented in Table 6.8. The path coefficient results across all datasets have exceeded the recommended threshold of 0.7, ranging from 0.718 to 0.848. Thus, the formative perceived value construct has exhibited a convergent validity across all datasets.

Table 6.7 Measurement Items of the Redundant Perceived Value Construct

Item	**Source**
PVR1: Taking all the pros and cons into consideration, the use of mobile payment is beneficial to me	(Lin, *et al.*, 2012)
PVR2: Compared to other payment methods, mobile payment is worthwhile to me	(Kim, *et al.*, 2007)
PVR3: Overall, the use of mobile payment gives me good value	(Lin, *et al.*, 2012)

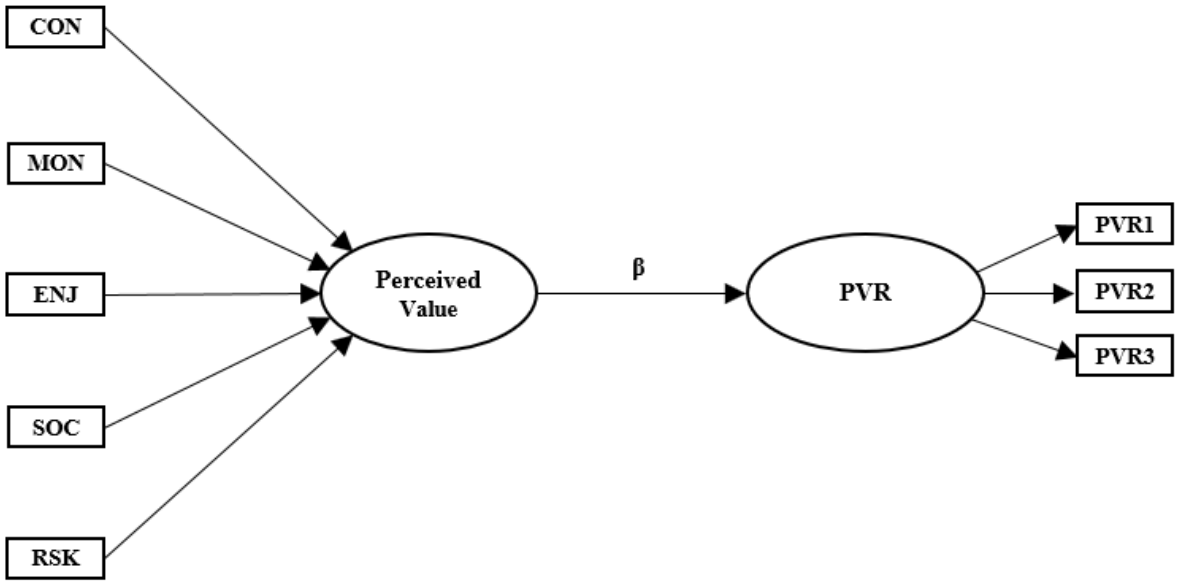

Figure 6.2 Redundancy Analysis Model

Table 6.8 Path Coefficient Results of Redundancy Analysis

Path	Path coefficient (β) – Nonadopters				Path coefficient (β) -Adopters			
	CVAS1	CVAS2	CVAS3	CVAS4	CVAS1	CVAS2	CVAS3	CVAS4
PV→PVR	0.831	0.848	0.822	0.829	0.785	0.745	0.718	0.769

PV: Perceived value, PVR: Perceived value as a reflective construct

6.7.2 Collinearity Analysis of the Second Order Construct Indicators

Collinearity refers to the high correlation between two or more formative indicators (Hair, *et al.*, 2017). As mentioned earlier, formative indicators are not assumed to be highly correlated because such a condition may potentially affect the results by boosting the standard error or incorrectly estimating the indicators' weights (Hair, *et al.*, 2017). Collinearity is measured by calculating the variance inflation factor (VIF). VIF represents the reciprocal of the amount of variance of each formative indicator not explained by other indicators of the same construct (Hair, *et al.*, 2017). A VIF value of 5 or higher (variance of 0.20 or lower) indicates a potential collinearity issue (Hair, *et al.*, 2011). VIF is directly obtained by running the PLS-SEM algorithm for the final stage-two model of Figure 6.3. Table 6.9 provides an evidence that no collinearity issues were found for the formative indicators across all datasets since all VIF values are well below 5.

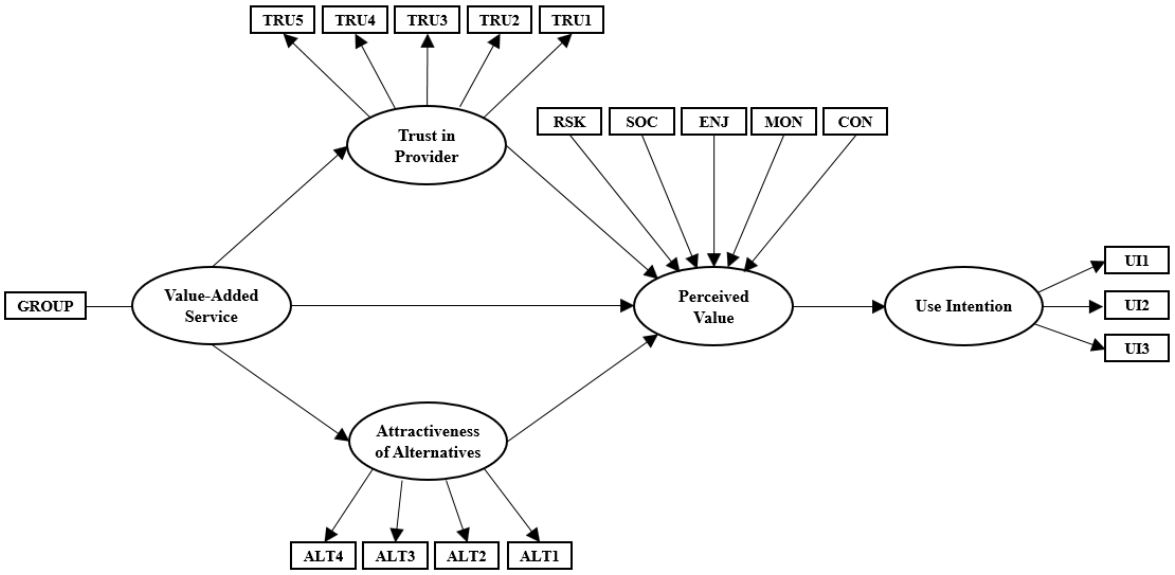

Figure 6.3 Stage-Two Final Research Model

Table 6.9 Collinearity Assessment for Formative Indicators

Formative indicator	VIF – Nonadopters				VIF – Adopters			
	CVAS1	CVAS2	CVAS3	CVAS4	CVAS1	CVAS2	CVAS3	CVAS4
CON	1.773	1.858	1.814	1.917	1.389	1.397	1.409	1.405
MON	1.395	1.360	1.469	1.283	1.148	1.172	1.101	1.248
ENJ	2.415	2.560	2.452	2.530	1.689	1.781	1.835	1.832
SOC	1.239	1.287	1.223	1.283	1.251	1.134	1.143	1.236
RSK	1.355	1.403	1.323	1.347	1.179	1.253	1.309	1.261

6.7.3 Significance of the Second Order Indicators Outer Weights

The last criterion for assessing the formative measurement model involves evaluating the significance of the formative indicators' outer weights. The outer weights indicate the relative contribution of each indicator towards the formative construct (Hair, *et al.*, 2017). To evaluate whether the outer weights are significantly different from zero, a bootstrapping procedure is used for the research model depicted in Figure 6.3. The bootstrapping procedure, which is provided by SmartPLS, is an approach used to validate the significance of the relationships in a model by drawing a large number of subsamples from the original sample (Hair, *et al.*, 2014). Each subsample is of the same size as the original sample and is drawn with replacement. This means that when an observation is drawn at random from the original sample, it is returned before the next observation is drawn (Hair, *et al.*, 2017). The model is then estimated for each bootstrap subsample to compute the standard error that is subsequently used to obtain the test statistic value (t-value) for each relationship (Henseler, *et al.*, 2016; Hair, *et al.*, 2017). Bootstrapping evaluates the significance of model relationships with the following input parameters: number of subsamples, test type, and significance level. Researchers

suggest that the maximum number of subsamples should be higher than or equal to the original sample, with a recommended number of 5,000 subsamples to ensure the stability of results (Marcoulides and Saunders, 2006; Hair, *et al.*, 2017). Test type can be one-tailed or two-tailed. A one-tailed test has been recommended if the model's relationships are hypothesised to have a sign, either in the negative or positive direction (Roldán and Sánchez-Franco, 2012; Kock, 2015). Since all proposed hypotheses of this study are assumed to have a direction, i.e. negative or positive association of variables, a one-tailed test was used. Finally, following the general recommendations (Hair, *et al.*, 2017), a 0.05 significance level (p-value) has been chosen. The p-value is the probability of whether an observed effect has occurred by random chance (Hair, *et al.*, 2017). This implies that the lower the p-value, the higher the significance of the observed effect. It also means that relationships are considered significant if p-value is less than 0.05, corresponding to a t-value higher than 1.650 for a one-tailed test. Therefore, for the remainder of this study, the bootstrapping procedure will be executed with 5000 subsamples, a one-tailed test, and a significance level of 0.05.

The bootstrapping results of the formative indicators outer weights are shown in Table 6.10. The results indicate that enjoyment value represents the highest significant positive perceived value (PV) component relative to other components, followed by convenience value across all datasets except for adopters' CVAS1 and CVAS3 datasets, where convenience value precedes enjoyment value as a positive perceived value component. Furthermore, perceived risk represents a significant negative perceived value component across all datasets. These results indicate that hypotheses H2a (CON→PV), H2c (ENJ→PV), and H2e (RSK→PV) are fully supported across all datasets.

Table 6.10 Significance of Formative Indicators' Outer Weights

CVAS1 (Instant Balance) – Nonadopters					
Hypothesis	**Indicator Path**	**Indicator Outer Weight**	**t-value**	**p-value**	**Result**
H2a	CON→PV	0.323	8.117	0.000	Accepted
H2b	MON→PV	0.092	2.500	0.006	Accepted
H2c	ENJ→PV	0.412	9.406	0.000	Accepted
H2d	SOC→PV	0.071	2.219	0.013	Accepted
H2e	RSK→PV	-0.403	10.713	0.000	Accepted
CVAS2 (Loyalty Card Integration) – Nonadopters					
H2a	CON→PV	0.299	7.460	0.000	Accepted
H2b	MON→PV	0.140	3.707	0.000	Accepted
H2c	ENJ→PV	0.462	8.526	0.000	Accepted
H2d	SOC→PV	-0.002	0.053	0.479	Rejected
H2e	RSK→PV	-0.370	8.705	0.000	Accepted

CVAS3 (Spending Tracker) – Nonadopters					
H2a	CON→PV	0.349	7.988	0.000	Accepted
H2b	MON→PV	0.080	1.843	0.033	Accepted
H2c	ENJ→PV	0.431	8.407	0.000	Accepted
H2d	SOC→PV	0.057	1.573	0.058	Rejected
H2e	RSK→PV	-0.375	8.429	0.000	Accepted
CVAS4 (Cashback) – Nonadopters					
H2a	CON→PV	0.376	8.420	0.000	Accepted
H2b	MON→PV	0.077	1.788	0.037	Accepted
H2c	ENJ→PV	0.408	7.639	0.000	Accepted
H2d	SOC→PV	0.056	1.512	0.065	Rejected
H2e	RSK→PV	-0.367	8.071	0.000	Accepted
CVAS1 (Instant Balance) – Adopters					
H2a	CON→PV	0.401	7.900	0.000	Accepted
H2b	MON→PV	0.016	0.347	0.364	Rejected
H2c	ENJ→PV	0.510	9.086	0.000	Accepted
H2d	SOC→PV	-0.004	0.089	0.465	Rejected
H2e	RSK→PV	-0.373	8.354	0.000	Accepted
CVAS2 (Loyalty Card Integration) – Adopters					
H2a	CON→PV	0.437	9.091	0.000	Accepted
H2b	MON→PV	0.023	0.424	0.336	Rejected
H2c	ENJ→PV	0.419	7.591	0.000	Accepted
H2d	SOC→PV	0.010	0.215	0.415	Rejected
H2e	RSK→PV	-0.435	8.643	0.000	Accepted
CVAS3 (Spending Tracker) – Adopters					
H2a	CON→PV	0.437	8.835	0.000	Accepted
H2b	MON→PV	0.096	1.299	0.097	Rejected
H2c	ENJ→PV	0.450	8.244	0.000	Accepted
H2d	SOC→PV	-0.052	1.102	0.135	Rejected
H2e	RSK→PV	-0.349	6.509	0.000	Accepted
CVAS4 (Cashback) – Adopters					
H2a	CON→PV	0.463	10.045	0.000	Accepted
H2b	MON→PV	-0.023	0.405	0.343	Rejected
H2c	ENJ→PV	0.380	6.684	0.000	Accepted
H2d	SOC→PV	0.002	0.041	0.484	Rejected

H2e	RSK→PV	-0.447	9.746	0.000	Accepted

On the other hand, monetary value is significant only across all nonadopter datasets, whereas social value is non-significant across all datasets except for nonadopters' CVAS1 dataset. Thus, the results partially support H2b (MON→PV) and H2d (SOC→PV). These results suggest that convenience value, enjoyment value, and perceived risk are significantly contributing to the formation of m-payment perceived value regardless of the value-added service offered. On the other hand, monetary value is significantly perceived as a positive component of perceived value only among the nonadopters when m-payment is augmented with any of the suggested value-added services. Social value is significantly perceived as a positive value component only among the nonadopters when m-payment is augmented with instant balance value-added service.

Researchers suggest that removing formative indicators that are not contributing significantly to the underlying construct should be based on the assessment of their absolute contribution towards that construct. Absolute contribution refers to the information the indicator provides to its construct regardless of other indicators (Cenfetelli and Bassellier, 2009; Hair, *et al.*, 2017). This is measured by the indicator's outer loading size and significance, where indicators with high and significant outer loading should be retained in the model (Cenfetelli and Bassellier, 2009; Hair, *et al.*, 2017). The results shown in Table 6.11 indicate that the outer loadings of MON and SOC are significant across all datasets. Therefore, indicators with nonsignificant weights will be retained for further analysis.

Table 6.11 Significance of Formative Indicators' Outer Loadings

CVAS2 (Loyalty Card Integration) – Nonadopters				
Indicator Path	**Indicator Outer Loading**	**t-value**	**p-value**	**Result**
SOC→PV	0.394	7.261	0.000	Significant
CVAS3 (Spending Tracker) – Nonadopters				
SOC→PV	0.410	7.235	0.000	Significant
CVAS4 (Cashback) – Nonadopters				
SOC→PV	0.438	8.148	0.000	Significant
CVAS1 (Spending Tracker) – Adopters				
SOC→PV	0.197	2.845	0.002	Significant
MON→PV	0.273	4.127	0.000	Significant
CVAS2 (Loyalty Card Integration) – Adopters				
SOC→PV	0.239	3.272	0.001	Significant
MON→PV	0.180	2.574	0.005	Significant

CVAS3 (Spending Tracker) – Adopters				
SOC→PV	0.303	3.427	0.000	Significant
MON→PV	0.178	2.615	0.004	Significant
CVAS4 (Cashback) – Adopters				
SOC→PV	0.165	2.408	0.008	Significant
MON→PV	0.156	2.332	0.010	Significant

6.8 Structural Model Assessment

Having assessed the reliability and validity of the measurement models, the second step of PLS-SEM analysis is to assess the structural model, which refers to the relationships among the model's constructs. The steps involved in structural model assessment are outlined in Table 6.12 along with the corresponding assessment guidelines as illustrated by Hair *et al.* (2017).

Table 6.12 Structural Model Assessment Criteria

Criteria	**Guidelines**
Collinearity of constructs	No collinearity if variance inflation factor (VIF) < 5
Path coefficients (β)	Bootstrapping with 5000 subsamples Significance level: p-value < 0.05 (t-value > 1.65) Test type: one-tailed
Coefficient of Determination (R^2)	Substantial: $R^2 = 0.75$ Moderate: $R^2 = 0.50$ Weak: $R^2 = 0.25$

6.8.1 Collinearity of Constructs

Collinearity of constructs is assessed to ensure that path coefficient estimates are not biased as a result of high correlation between a set of predictor constructs. To assess collinearity of constructs, the same criterion used for the formative measurement model collinearity evaluation (subsection 6.7.2) is applied. That is, the variance inflation factor (VIF) level is assessed against a maximum threshold of 5 for each construct in a set of predictor constructs (Hair, *et al.*, 2017). The research model includes one set of predictor constructs that jointly predict perceived value, namely trust in provider, value-added service, and attractiveness of alternatives. Table 6.13 shows the VIF levels for each predictor construct across all datasets as resulted from running the PLS-SEM algorithm. No collinearity issues were found since all VIF levels are well below 5.

Table 6.13 Construct Collinearity Statistics of Combined Datasets

Construct	**VIF – Nonadopters**				**VIF – Adopters**			
	CVAS1	**CVAS2**	**CVAS3**	**CVAS4**	**CVAS1**	**CVAS2**	**CVAS3**	**CVAS4**

TRU	1.115	1.221	1.152	1.228	1.134	1.096	1.107	1.106
VAS	1.019	1.026	1.006	1.010	1.005	1.025	1.014	1.003
ALT	1.129	1.245	1.147	1.217	1.137	1.097	1.121	1.104

6.8.2 Path Coefficients

Path coefficients refer to the estimates of the hypothesised relationships among the model constructs, with values ranging from -1 to +1. The path coefficient value reflects the change in the dependent variable that results from a one-unit change in the independent variable when all other constructs and their relationships remain constant (Hair, *et al.*, 2017). Therefore, the higher the value, either in the negative or positive direction, the stronger the relationship. The significance of path coefficients, i.e. whether they are significantly different from zero, is assessed using the same bootstrapping procedure described in subsection 6.7.3. The bootstrapping results for the relationships of each dataset are shown in Table 6.14.

Table 6.14 Structural Model Hypothesis Testing Results

CVAS1 (Instant Balance) – Nonadopters					
Hypothesis	**Path**	**Coefficient (β)**	**t-value**	**p-value**	**Result**
H1	PV→UI	0.826	55.282	0.000	Accepted
H3	TRU→PV	0.590	19.374	0.000	Accepted
H4a	VAS→PV	0.021	0.638	0.262	Rejected
H4b	VAS→TRU	-0.034	0.662	0.254	Rejected
H4c	VAS→ALT	-0.116	2.218	0.013	Accepted
H5	ALT→PV	-0.416	13.647	0.000	Accepted
CVAS2 (Loyalty Card Integration) – Nonadopters					
H1	PV → UI	0.836	58.386	0.000	Accepted
H3	TRU→PV	0.570	18.880	0.000	Accepted
H4a	VAS→PV	0.069	2.014	0.022	Accepted
H4b	VAS→TRU	-0.012	0.231	0.409	Rejected
H4c	VAS→ALT	-0.139	2.673	0.004	Accepted
H5	ALT→PV	-0.373	11.005	0.000	Accepted
CVAS3 (Spending Tracker) – Nonadopters					
H1	PV → UI	0.790	41.581	0.000	Accepted
H3	TRU→PV	0.552	18.313	0.000	Accepted
H4a	VAS→PV	0.042	1.151	0.125	Rejected
H4b	VAS→TRU	0.075	1.462	0.072	Rejected
H4c	VAS→ALT	-0.040	0.751	0.226	Rejected

H5	ALT→PV	-0.420	14.043	0.000	Accepted
CVAS4 (Cashback) – Nonadopters					
H1	PV → UI	0.806	46.768	0.000	Accepted
H3	TRU→PV	0.563	17.848	0.000	Accepted
H4a	VAS→PV	0.044	1.139	0.127	Rejected
H4b	VAS→TRU	-0.099	1.862	0.031	Rejected
H4c	VAS→ALT	0.032	0.581	0.280	Rejected
H5	ALT→PV	-0.401	12.253	0.000	Accepted
CVAS1 (Instant Balance) – Adopters					
H1	PV → UI	0.756	26.704	0.000	Accepted
H3	TRU→PV	0.526	13.052	0.000	Accepted
H4a	VAS→PV	-0.002	0.052	0.479	Rejected
H4b	VAS→TRU	-0.021	0.362	0.359	Rejected
H4c	VAS→ALT	-0.054	0.946	0.172	Rejected
H5	ALT→PV	-0.420	10.916	0.000	Accepted
CVAS2 (Loyalty Card Integration) – Adopters					
H1	PV → UI	0.717	23.553	0.000	Accepted
H3	TRU→PV	0.442	9.814	0.000	Accepted
H4a	VAS→PV	0.055	1.187	0.118	Rejected
H4b	VAS→TRU	-0.091	1.665	0.048	Rejected
H4c	VAS→ALT	-0.098	1.729	0.042	Accepted
H5	ALT→PV	-0.512	15.176	0.000	Accepted
CVAS3 (Spending Tracker) – Adopters					
H1	PV → UI	0.686	15.995	0.000	Accepted
H3	TRU→PV	0.520	15.202	0.000	Accepted
H4a	VAS→PV	0.071	1.098	0.136	Rejected
H4b	VAS→TRU	0.010	0.177	0.430	Rejected
H4c	VAS→ALT	-0.115	2.003	0.023	Accepted
H5	ALT→PV	-0.424	10.019	0.000	Accepted
CVAS4 (Cashback) – Adopters					
H1	PV → UI	0.735	24.948	0.000	Accepted
H3	TRU→PV	0.571	15.031	0.000	Accepted
H4a	VAS→PV	-0.015	0.331	0.370	Rejected
H4b	VAS→TRU	-0.048	0.856	0.196	Rejected
H4c	VAS→ALT	-0.011	0.196	0.422	Rejected

H5	ALT→PV	-0.402	9.795	0.000	Accepted

ALT: Attractiveness of alternatives, PV: Perceived Value, TRU: Trust in Provider, UI: Use Intention, VAS: Value-added Service

The results indicate that hypotheses H1 (PV→UI), H3 (TRU→PV), and H5 (ALT→PV) were fully supported across the eight datasets (p-value <0.001). This confirms the positive effect of perceived value on use intention, the positive effect of trust in provider on perceived value, and the negative effect of attractiveness of alternatives on perceived value. On the other hand, hypotheses H4a (VAS→PV), H4b (VAS→TRU), and H4c (VAS→ALT) were not fully supported across all datasets. The hypothesised positive effect of value-added service on m-payment perceived value could only be confirmed in the nonadopters' CVAS2 dataset (β=0.069, p-value<0.05), suggesting a partial support for H4a. No significant effect was found between the value-added service and trust in provider across all datasets. Thus, the hypothesised positive effect of value-added service on trust in provider (H4b) is fully rejected by the data. Three of the suggested value-added services exhibited a significant negative effect on attractiveness of alternatives, namely CVAS1 (β=-0.116, p-value<0.05) and CVAS2 (β=-0.139, p-value<0.01) among nonadopters; and CVAS2 (β=-0.098, p-value<0.05) and CVAS3 (β=-0.114, p-value<0.05) among adopters. Therefore, the hypothesised negative effect of value-added service on attractiveness of alternatives (H4c) has been partially supported by the data.

Indirect Effects of Value-added Services

The above assessment of path coefficients only considers the hypothesised direct effects of the value-added service construct in the model, namely VAS→TRU, VAS→PV, and VAS→ALT. To gain a broader understanding of the impact of value-added services on m-payment perceived value and use intention, the path coefficients of the indirect relationships were assessed. Referring to the research model shown in Figure 6.3, the indirect effects include VAS→PV→UI, VAS→TRU→PV, VAS→TRU→PV→UI, VAS→ALT→PV, VAS→ALT→PV→UI. However, since VAS has no effect on TRU across all datasets, the indirect effect analysis does not apply to the paths VAS→TRU→PV and VAS→TRU→PV→UI. Likewise, the analysis does not apply to the datasets in which the paths VAS→PV and/or VAS→ALT are/is nonsignificant. The bootstrapping results for the remaining indirect relationships are presented in Table 6.15.

Table 6.15 Indirect Effects of Value-added Services

CVAS1 (Instant Balance) – Nonadopters				
Path	**Coefficient (β)**	**t-value**	**p-value**	**Result**
VAS→ALT→PV	0.048	2.219	0.027	Significant
VAS→ALT→PV→UI	0.040	2.213	0.027	Significant
CVAS2 (Loyalty Card Integration) – Nonadopters				

VAS→PV→UI	0.058	1.999	0.046	Significant
VAS→ALT→PV	0.052	2.581	0.010	Significant
VAS→ALT→PV→UI	0.043	2.577	0.010	Significant
CVAS2 (Loyalty Card Integration) – Adopters				
VAS→ALT→PV	0.050	1.708	0.044	Significant
VAS→ALT→PV→UI	0.036	1.701	0.045	Significant
CVAS3 (Spending Tracker) – Adopters				
VAS→ALT→PV	0.049	1.990	0.023	Significant
VAS→ALT→PV→UI	0.033	1.935	0.027	Significant

The results show that value-added services have a significant positive effect on m-payment use intention in two of the nonadopters' datasets, CVAS1 and CVAS2; and two of the adopters' datasets, CVAS2 and CVAS3. It is observed that the effect of value-added services on perceived value is fully mediated by attractiveness of alternatives in nonadopters' CVAS1 and adopters' CVAS2 and CVAS3 datasets. A full mediation occurs when the direct effect is nonsignificant whereas the indirect effect is significant (Nitzl, Roldan and Cepeda, 2016). As shown in Table 6.14, the direct path VAS→PV is nonsignificant in these datasets. According to Hair *et al.* (2017), a full mediation situation suggests that the mediator construct is fully compliant with the hypothesised theoretical model. On the other hand, attractiveness of alternatives partially mediates the same effect in nonadopters' CVAS2 since both the direct (VAS→PV) and indirect (VAS→ALT→PV) effects are significant (Nitzl, *et al.*, 2016). These results suggest that nonadopters are likely to use m-payment augmented with instant balance value-added service because it can reduce the attractiveness of existing payment methods and consequently increase m-payment perceived value. Similarly, adopters are likely to use m-payment augmented with loyalty cards or spending tracker value-added services due to their negative effect on the attractiveness of alternative payment methods, which has consequently led to increasing m-payment value perceptions. In terms of the partial mediation case, the results indicate that nonadopters are likely to use m-payment augmented with loyalty cards because it enhanced their perceptions of m-payment value in its own right. In addition, the integration of loyalty cards with m-payment has reduced the attractiveness of alternative payment methods and further enhanced m-payment perceived value as a consequence.

The Effects on the Individual Components of Perceived Value

As shown earlier, stage-two model allows the assessment of the antecedent effects of trust in provider, value-added service, and attractiveness of alternatives on m-payment perceived value at the overall abstract level. To further understand how such effects are formed through the lower order components level, stage-one model (Figure 6.1) was used to assess the direct effects on convenience value, monetary value, enjoyment value, social value, and perceived risk. To do so, collinearity of

constructs was first assessed for each dataset. The model includes two sets of predictor constructs: (1) trust in provider, value-added service, and attractiveness of alternatives are jointly predicting each component of perceived value; and (2) convenience value, monetary value, enjoyment value, social value, and perceived risk are jointly predicting use intention. The results (included in Appendix 6.2) show no collinearity issues across all datasets since all VIF levels are well below the maximum threshold of 5. Table 6.16 outlines the bootstrapping results of the effects of interest from stage-one model.

Table 6.16 Effects of Antecedent Constructs of Perceived Value on its Lower Order Components

Nonadopters								
	CVAS1		**CVAS2**		**CVAS3**		**CVAS4**	
Path	**β**	**t-value**	**β**	**t-value**	**β**	**t-value**	**β**	**t-value**
ALT→CON	-0.359**	9.796	-0.326**	7.812	-0.333**	8.032	-0.343**	8.573
ALT→MON	-0.243**	4.869	-0.289**	5.595	-0.304**	6.173	-0.218**	4.055
ALT→ENJ	-0.352**	8.772	-0.304**	7.345	-0.378**	9.459	-0.352**	7.887
ALT→SOC	-0.276**	5.406	-0.207**	3.561	-0.315**	6.230	-0.289**	5.068
ALT→RSK	0.279**	6.477	0.257**	5.532	0.260**	5.621	0.260**	5.376
TRU→CON	0.459**	11.448	0.432**	10.238	0.458**	11.306	0.485**	11.749
TRU→MON	0.255**	5.150	0.212**	4.228	0.211**	4.415	0.275**	5.167
TRU→ENJ	0.497**	13.731	0.535**	15.477	0.457**	12.489	0.469**	11.749
TRU→SOC	0.211**	4.167	0.206**	4.037	0.111*	1.998	0.147**	2.740
TRU→RSK	-0.491**	10.713	-0.444**	8.196	-0.457**	9.126	-0.436**	8.810
VAS→CON	-0.045	1.180	0.045	1.076	-0.024	0.612	-0.031	0.803
VAS→MON	0.291**	6.652	0.306**	6.937	0.380**	9.418	0.391**	8.741
VAS→ENJ	0.037	1.004	0.035	0.974	0.074*	1.952	0.036	0.944
VAS→SOC	-0.045	0.944	-0.107	2.133	-0.055	1.130	-0.116	2.353
VAS→RSK	0.008	0.195	0.010	0.227	0.023	0.572	-0.046	1.027
Adopters								
	CVAS1		**CVAS2**		**CVAS3**		**CVAS4**	
Path	**β**	**t-value**	**β**	**t-value**	**β**	**t-value**	**β**	**t-value**
ALT→CON	-0.276**	4.084	-0.375**	7.931	-0.347**	7.285	-0.291**	6.170
ALT→MON	-0.163**	2.778	-0.128*	2.200	-0.117*	2.333	-0.080	1.531
ALT→ENJ	-0.314**	6.730	-0.353**	7.734	-0.314**	5.841	-0.229**	4.840
ALT→SOC	-0.154**	2.532	-0.047	0.769	-0.119*	1.932	-0.027	0.416
ALT→RSK	0.390**	8.661	0.452**	10.614	0.363**	6.705	0.405**	9.328
TRU→CON	0.376**	6.800	0.286**	5.278	0.369**	7.694	0.406**	8.026
TRU→MON	0.081*	1.374	0.127*	2.147	0.166**	3.299	0.156**	2.863
TRU→ENJ	0.466**	9.843	0.411**	8.198	0.454**	10.350	0.537**	11.719

TRU→SOC	0.129*	2.039	0.206**	3.334	0.109*	1.798	0.177**	3.071
TRU→RSK	-0.373**	8.191	-0.323**	6.969	-0.409**	7.964	-0.409**	9.210
VAS→CON	0.028	0.585	0.192**	4.162	0.065	1.456	0.049	1.040
VAS→MON	0.387**	8.230	0.453**	10.062	0.610**	17.945	0.439**	9.696
VAS→ENJ	-0.004	0.088	0.093*	2.094	0.027	0.612	0.029	0.659
VAS→SOC	-0.004	0.075	0.012	0.218	-0.002	0.037	0.041	0.718
VAS→RSK	0.047	1.040	0.182	4.233	0.081	1.802	0.087	2.059

** p-value<0.01, * p-value<0.05

The results show that attractiveness of alternatives has a significant negative effect (p-value<0.01) on all the benefit components and a significant positive effect on perceived risk as a sacrifice component across all the nonadopters' datasets. On the other hand, the effect of attractiveness of alternatives is less pronounced on monetary and social value components in the adopters' CVAS2, CVAS3, and CVAS4 datasets in comparison with the same nonadopters' datasets. In terms of the effect of trust in provider, the results reveal a significant positive effect on all the benefit components and a significant negative effect on perceived risk across all datasets regardless of previous m-payment experience.

Based on the theoretical reasoning discussed in Chapter 2 (subsection 2.10), the hypothesised positive effect of value-added services on perceived value is assumed to be the result of their positive effect on the benefit components and negative effect on the sacrifice components (Zeithaml, 1988; Ravald and Grönroos, 1996). In terms of the research model, the value-added service construct is supposed to be positively associated with convenience value, monetary value, enjoyment value, and social value; and negatively associated with perceived risk. The results show a differential effect of value-added services on the individual components of value among nonadopters and adopters. Whilst value-added services had no significant effect on perceptions of convenience across all nonadopters' datasets, adopters perceived an added convenience value only in the case of loyalty card integration. Conversely, the positive effect of value-added services on monetary value has been confirmed across all datasets (p-value < 0.01). This result indicates the strong influence of value-added services in enhancing m-payment monetary value perceptions among consumers regardless of their m-payment experience. In terms of enjoyment value, the positive effect of value-added services has been confirmed in nonadopters' CVAS3 and adopters' CVAS2 and CVAS3 datasets. Against the presumed positive direction, the results indicate a negative association between value-added services and social value across all nonadopters' datasets and adopters' CVAS1 and CVAS3 datasets. A nonsignificant positive association has been found between value-added services and social value in the remaining adopters' datasets, CVAS2 and CVAS4. Finally, value-added services have been found to increase perceptions of risk across all datasets except for nonadopters' CVAS4 dataset, where the presumed negative effect was found to be nonsignificant.

6.8.3 Coefficient of Determination

The model's predictive power is measured by the coefficient of determination (R^2). R^2 refers to the amount of variance explained in each endogenous (dependent) construct by all of the exogenous (independent) constructs linked to it (Hair, *et al.*, 2017). The value of R^2 ranges from 0 to 1, where higher values represent higher predictive power. Researchers suggest that acceptable levels of R^2 are based on the research context (Hair, Ringle and Sarstedt, 2013). For instance, Chin (1998) suggested that values of 0.67, 0.33, or 0.19 represent substantial, moderate, or weak levels of R^2 respectively. Hair *et al.* (2019) recommended using the cut-off values of 0.75, 0.50, or 0.25 as guidelines to interpret the same levels. R^2 values presented in Table 6.17 were obtained by running the PLS-SEM algorithm for the final stage-two model of Figure 6.3.

Table 6.17 Coefficient of Determination Results

Construct	R^2 – Nonadopters				R^2 – Adopters			
	CVAS1	**CVAS2**	**CVAS3**	**CVAS4**	**CVAS1**	**CVAS2**	**CVAS3**	**CVAS4**
TRU	0.001	0.000	0.006	0.010	0.000	0.008	0.000	0.002
ALT	0.013	0.019	0.002	0.001	0.003	0.010	0.013	0.000
PV	0.676	0.653	0.653	0.665	0.604	0.585	0.599	0.629
UI	0.682	0.699	0.624	0.650	0.572	0.514	0.470	0.540

The results reveal moderate levels (higher than 0.50) of R^2 for perceived value and use intention across all datasets except for adopters' CVAS3 dataset, where R^2 for use intention (0.47) is slightly below the moderate level. However, Hair *et al.* (2017) explain that interpretation of R^2 level is largely dependent on the research domain. For instance, the authors indicated that in the context of consumer behaviour studies, an R^2 value of 0.20 is considered as high. Therefore, the results indicate that the proposed model is well supported by the data since it explained 47% to 69.9% of variance in use intention and 58.5% to 67.6% of variance in perceived value. On the other hand, R^2 levels for trust in provider and attractiveness of alternatives show weak levels that ranged from 0.000 to 0.008 and 0.000 to 0.019. This is partly due to having one exogenous construct (value-added service) pointing to each of them, where the higher the number of paths pointing to an endogenous construct the higher the R^2 value (Hair, *et al.*, 2017). However, these results also indicate a relatively weak effect of value-added service on attractiveness of alternatives and trust in provider within the m-payment context. Although R^2 results indicate that the model has performed better in terms of predictive power among nonadopters as compared to adopters, they suggest that the proposed model is well supported by data from both groups.

6.9 Discussion of the Quantitative Findings

This section provides a detailed discussion of the quantitative findings in terms of the research model's constructs and their hypothesised relationships. Table 6.18 outlines the study hypotheses

along with their respective testing results. The discussion will also cross-validate the qualitative and quantitative findings and establish links with existing literature.

Table 6.18 Study Hypotheses Testing Results

Hypothesis	**Result**
H1: Perceived Value of m-payment has a positive effect on its Use Intention	Supported
H2a: Convenience Value of m-payment has a positive contribution towards its Perceived Value	Supported
H2b: Monetary Value of m-payment has a positive contribution towards its Perceived Value	Partially Supported
H2c: Enjoyment Value of m-payment has a positive contribution towards its Perceived Value	Supported
H2d: Social Value of m-payment has a positive contribution towards its Perceived Value	Partially Supported
H2e: Perceived Risk of m-payment has a negative contribution towards its Perceived Value	Supported
H3: Trust in Provider of m-payment has a positive effect on the Perceived Value of m-payment	Supported
H4a: Value-Added Service has a positive effect on Perceived Value of m-payment	Partially Supported
H4b: Value-Added Service has a positive effect on Trust in Provider of m-payment	Rejected
H4c: Value-added Service has a negative effect on Attractiveness of Alternatives	Partially Supported
H5: Attractiveness of Alternatives has a negative effect on the Perceived Value of m-payment	Supported

6.9.1 Perceived Value and its Components

The hypothesised positive effect of the overall m-payment perceived value has been supported by the quantitative data, regardless of the proposed value-added service and previous m-payment experience. In line with previous research (Turel, *et al.*, 2010; Cocosila and Trabelsi, 2016), these results confirm the relevance of perceived value as a higher order sole predictor of behavioural intentions towards technology. The following subsections will discuss the quantitative results pertaining to each of the lower order components of perceived value.

Convenience Value: The quantitative results have confirmed the significant positive contribution of convenience value towards the overall m-payment perceived value, regardless of the proposed value-added service and previous m-payment experience. This was evident from the significant indicators' outer weights (p-value<0.001) across all datasets (Table 6.10). These results are also congruent with the qualitative findings of Chapter 5 that suggested the importance of convenience as a utilitarian value dimension among adopters and nonadopters. Therefore, perceptions of m-payment value are heavily influenced by the degree to which consumers recognise m-payment as a payment instrument that can be effortlessly used anytime and anywhere. Previous studies have confirmed the significant positive effect of m-payment convenience as an antecedent of perceived value (Lin, *et al.*, 2018). However, the results of this study have provided a further evidence of the significance of convenience as a formative component of m-payment perceived value construct.

Monetary Value: The hypothesised positive contribution of monetary towards m-payment perceived value has only been confirmed among the nonadopters regardless of the suggested value-added service. The highest contribution was found in the loyalty card integration group (outer weight=0.140, p-value<0.001), followed by instant balance (outer weight=0.092, p-value<0.05), spending tracker (outer weight=0.080, p-value<0.05), and cashback (outer weight=0.077, p-value<0.05). These results suggest that nonadopters perceive more economic benefits from value-added services that help to save money than from those that offer direct monetary incentives. On the other hand, adopters do not perceive monetary value as a significant determinant of m-payment perceived value, albeit the marginally significant outer weight in the spending tracker group (outer weight=0.096, p-value<0.1). One possible explanation of this finding may be related to the negative perception of monetary value that adopters associate with m-payment as discussed in the qualitative findings (section 5.4). Furthermore, the negative contribution of monetary value in the cashback group (outer weight=-0.023) supports this explanation. As compared to convenience value, monetary value exhibits far less influence on the overall perceived value of m-payment regardless of the offered value-added service. Therefore, the evidence provided by the qualitative and quantitative findings support the validity of dichotomising the utilitarian value into convenience and monetary value dimensions within the context of m-payment. Although this approach has been adopted by previous studies (Pura, 2005; de Kerviler, *et al.*, 2016), other studies have operationalised convenience and monetary value dimensions under a single 'utilitarian value' construct (Cocosila and Trabelsi, 2016; Gan and Wang, 2017). Thus, the findings of this study further demonstrate the relevance of conceptualising monetary and convenience value dimensions as separate constructs.

Enjoyment Value: Similar to convenience value, the positive contribution of enjoyment value towards m-payment perceived value has been confirmed across all groups (p-value<0.001). Furthermore, the findings suggest that enjoyment value has a higher contribution than convenience value towards m-payment perceived value among the nonadopters across all groups. The same

applies for adopters in the instant balance and spending tracker groups as convenience exhibits a higher influence in the loyalty card and cashback groups. Whilst some previous studies have confirmed that enjoyment value has a higher influence than convenience in the m-payment context (de Kerviler, *et al.*, 2016), others have demonstrated the precedence of convenience over enjoyment by a small difference (Omigie, *et al.*, 2017). The qualitative findings suggest that convenience and enjoyment are closely related as participants derived emotional aspects based on perceptions of convenience. This agrees with the quantitative findings as evidenced in the relatively high correlation between convenience and enjoyment across all groups as shown in Appendix 6.1. Therefore, it could be concluded that consumers' emotional perceptions of using m-payment have a strong influence on the overall m-payment value regardless of the offered value-added service.

Social Value: The quantitative results have confirmed the marginal contribution of social value towards m-payment perceived value as suggested by the qualitative findings. As outlined in Table 6.10, the hypothesised positive contribution of social value was not supported across all groups except for the nonadopters' instant balance group (outer weight=0.071, p-value<0.05). The nonadopters' spending tracker and cashback groups have shown marginal support (outer weight=0.057, p-value<0.1; and outer weight=0.056, p-value<0.1 respectively). In contrast, social value has negatively influenced perceptions of m-payment perceived in some groups, including the nonadopters' loyalty card integration and adopters' instant balance and spending tracker. Although these results differ from some previous studies (Cocosila and Trabelsi, 2016; de Kerviler, *et al.*, 2016), they are consistent with Omigie *et al.*'s (2017). The difference between the findings of this study and the previous studies could be attributed to privacy concerns. This was evident in the comments of some participants of the qualitative study who indicated that they do not talk about their financial affairs in a social setting. Furthermore, in a study that investigated behavioural intentions towards mobile financial services, Omigie *et al.* (2017) explained that consumers tend to use mobile financial services for their utilitarian and emotional benefits and not for any social gains. Based on these results, it can generally be concluded that consumers do not perceive using m-payment as a relevant means to enhance their social image.

Perceived Risk: The hypothesised negative contribution of perceived risk towards m-payment perceived value has been confirmed across all groups (p-value<0.001). These results are in line with the qualitative findings that suggested the association between high risk and low value perceptions among the nonadopters, and low risk and high value perceptions among the adopters. In addition, the quantitative results confirm the findings of previous studies which showed the significance of the negative contribution of perceived risk as a formative component of value (Cocosila and Trabelsi, 2016). Overall, these findings highlight the importance of including perceived risk in models that aim to predict consumer behavioural intentions towards m-payment as indicated by previous research

(Yang, *et al.*, 2015). More specifically, perceived risk represents one of the principal determinants of consumer perceived value to predict m-payment behavioural intentions.

6.9.2 Trust in Provider

The quantitative results have confirmed the hypothesised positive effect of trust in provider on m-payment perceived value across all groups (p-value<0.001), regardless of m-payment experience and the offered value-added service. As illustrated in Table 6.16, the results also confirm the presumed positive effect of trust in provider on the lower order benefit components of value and the negative effect on perceived risk as a nonmonetary sacrifice component across all groups. These results are consistent with the qualitative findings which suggested that consumers perceive more benefits and lower risks when the service provider is recognised as trustworthy. Existing m-payment adoption research has confirmed the positive effect of trust in provider on consumer behavioural intentions through the lens of traditional technology adoption models (Slade, Williams, *et al.*, 2015; Khalilzadeh, *et al.*, 2017). The findings of the current study, which are also consistent with previous research in the online shopping context (Kim, *et al.*, 2012), provide a novel contribution to m-payment adoption research by confirming the positive effect of trust in provider using a value-based model. Therefore, it can be concluded that the degree to which consumers perceive m-payment service providers as benevolent and competent will strongly affect their perceptions of value for the services they provide, and consequently their behavioural intentions.

6.9.3 Attractiveness of Alternatives

Extending the proposed research model with attractiveness of alternatives based on the findings of the qualitative study has proved to be successful. This is evidenced in the hypothesis testing results (Table 6.14) which confirmed a significant negative effect of attractiveness of alternatives on m-payment perceived value across all groups (p-value<0.001), regardless of m-payment previous experience and the offered value-added service. Such negative effect on the abstract level of value was a result of the significant negative effect on the lower order benefit components of value and the significant negative effect on perceived risk across all nonadopters' groups (p-value<0.001) as shown in Table 6.16. For adopters, the effect was nonsignificant on social value in the loyalty card integration group and on both monetary and social value components in the cashback group. By observing the t-value in tables 6.14 and 6.16, the negative effect of attractiveness of alternatives is relatively stronger among the nonadopters. These results further confirm the findings of the qualitative study that suggested a higher impact of existing payment methods on m-payment perceived value among the nonadopters. In addition, the results confirm that attractiveness of alternatives exhibits a higher negative impact on m-payment perceived value than perceived risk since it positively affects risk perceptions.

Whilst previous m-payment research has confirmed the negative effect of attractiveness of alternatives on behavioural intention (Pham and Ho, 2015), little empirical evidence has been found to date associating attractiveness of alternatives and m-payment perceived value. Therefore, the results of this study have provided another original contribution to m-payment research by highlighting the impact of the attractiveness of existing payment methods on m-payment perceived value.

6.9.4 Value-added Service

This subsection discusses the findings related to the direct and indirect effects of the value-added service on the constructs underpinning the proposed research model (Figure 6.3). Table 6.19 provides a summary of these findings.

Table 6.19 A Summary of the Effects of the Value-Added Service

Value-added service	Trust in Provider	Attractiveness of Alternatives	Perceived Value (direct / indirect)	Use Intention (Indirect)
Nonadopters				
Instant Balance	ns.	-0.116*	ns. / 0.048*	0.040*
Loyalty Card Integration	ns.	-0.139**	0.069* / 0.052*	0.058*
Spending Tracker	ns.	ns.	ns. / ns.	ns.
Cashback	ns.	ns.	ns. / ns.	ns.
Adopters				
Instant Balance	ns.	ns.	ns. / ns.	ns.
Loyalty Card Integration	ns.	-0.098*	ns. / 0.050*	0.036*
Spending Tracker	ns.	-0.115*	ns. / 0.049*	0.033*
Cashback	ns.	ns.	ns. / ns.	ns.

ns. nonsignificant, ** p-value<0.01, * p-value<0.05

The Effect on Trust in Provider: Contrary to the hypothesised positive effect, the value-added service has been found to negatively affect perceptions of trust in provider across all groups except for the spending tracker group of adopters (β=0.010, nonsignificant) and nonadopters (β=0.075, p-value<0.1). In contrast, the qualitative findings suggest that augmenting m-payment with value-added services does enhance perceptions of trust in provider. This rather contradictory result may be attributable to the relative difference in participants' perceptions of added benefits and sacrifices across the two studies. Participants of the qualitative study have strongly acknowledged the added convenience, monetary, and enjoyment value dimensions while associating minimal risks with value-added services. On the other hand, the majority of respondents of the quantitative study have mainly recognised an added monetary value while generally associating more risks with value-added services. Previous studies have shown that perceptions of benefits, such as usefulness, ease of use, and perceived security, enhance consumers' trust in online and mobile banking environments

(Koufaris and Hampton-Sosa, 2004; Kim, Shin and Lee, 2009). Therefore, consumers' perception of trust in m-payment service providers is likely to be associated with the degree to which they perceive the added benefits and/or sacrifices resulting from value-added services. Accordingly, it can be concluded from the quantitative findings of this study that consumers' perceived added value from the proposed value-added services does not seem to be enough to enhance their perception of trust in provider.

The Effect on Attractiveness of Alternatives: The hypothesised negative effect of value-added services on attractiveness of alternatives has been supported in the nonadopters' instant balance and loyalty card integration groups and the adopters' loyalty card integration and spending tracker groups. This agrees with the findings of the qualitative study that suggest that augmenting m-payment with value-added services can potentially decrease the attractiveness of existing payment methods as a result of the perceived added benefits. Another equally important finding of the quantitative analysis is the mediation role of attractiveness of alternatives between the value-added service and m-payment perceived value in the above mentioned groups. This finding suggests that consumers' perceptions of m-payment value are not only affected by the perceived added benefits and/or decreased sacrifices resulting from offering value-added services as indicated by previous research (Hayashi, 2012; de Reuver, *et al.*, 2015; Apanasevic, *et al.*, 2016; Madureira, 2017). Instead, the extent to which m-payment augmented with a value-added service reduces consumers' attraction towards existing payment methods has also proved to be instrumental in shaping their m-payment value perceptions and the eventual behavioural intention. The perceived added benefits in their own right could lead to favourable outcomes on perceived value and use intention, as in the case of the nonadopters' loyalty card integration group. However, the findings from the nonadopters' instant balance group and the adopters' loyalty card integration and spending tracker groups provide evidence that the perceived added benefits may not always be enough when the effect of existing payment methods is taken into consideration. The above findings provide another original contribution to m-payment adoption research by emphasising the importance of the indirect effect of value-added services on m-payment perceived value through attractiveness of alternatives.

The Effect on Perceived Value: The experimental results indicate that the hypothesised direct positive effect of value-added services on m-payment perceived value has only been confirmed in the nonadopters' group of loyalty card integration. The results also suggest that the significant positive impact of value-added services on one or more lower-order benefit components of value does not necessarily lead to significant added value perceptions at an overall abstract level. For instance, nonadopters have perceived a significant (p-value<0.05) overall added value because of increased monetary value perceptions in the loyalty card integration group. On the other hand, a marginally significant (p-value<0.1) overall added value was perceived in the spending tracker group, despite of the increased monetary and enjoyment value perceptions. Similarly, adopters have

not perceived a significant overall added value regardless of the proposed value-added service. This is despite of their perceptions of increased monetary value across all the adopters' groups in addition to increased convenience and enjoyment value perceptions in the loyalty card integration group. One observation from these results is the relatively high positive effect that the value-added service has on perceived risk across all the adopters' groups and the nonadopters' spending tracker group as shown in Table 6.16. This implies that the positive impact of value-added service on m-payment overall value has been negatively affected as a result of increased perceptions of risk that the value-added service caused. Whilst the qualitative findings indicate that value-added services do not seem to decrease perceptions of risk as theorised, the quantitative results further suggest that value-added services could potentially increase perceptions of risk associated with m-payment. Since the increase in perceptions of risk was far more pronounced among the adopters' groups, a reasonable explanation could be related to their satisfaction with the security of existing m-payment services. In addition, adopters may be more technology oriented, which means that their awareness of technology may have led to anticipating additional risks associated with value-added services. These results underline the relevance of including perceived risk in models that assess the effect of value-added services on m-payment adoption. The results also confirm the argument presented in section 2.11 suggesting that findings from previous m-payment value-added services studies (Augsburg and Hedman, 2014; Balachandran and Tan, 2015) should be interpreted with caution since they do not take account of the effect of perceived risk.

The Indirect Effect on Use Intention: The analysis of indirect effects of the value-added service on use intention has shown that augmenting m-payment with instant balance or loyalty cards has significantly increased m-payment use intention among the nonadopters. This was a result of perceiving m-payment augmented with these value-added services as more attractive than their existing traditional payment methods. In addition, augmenting m-payment with loyalty card integration value-added service has also increased their perceptions of m-payment value compared to m-payment as a sole service. On the other hand, augmenting m-payment with loyalty cards or spending tracker value-added services has significantly increased adopters' intentions to use m-payment apps that offer such value-added services. This was due to perceiving m-payment augmented with these value-added services as more attractive than their existing m-payment apps and traditional payment methods. These findings offer further evidence on the central role of attractiveness of alternatives in judging the added value perceived in value-added services and its consequent impact on consumers' intentions to use m-payment. The findings also highlight the highly subjective and complex nature of value, which is differently assessed based on the diverse needs of different consumers.

6.10 Summary

This chapter has provided a two-step process to assess the proposed research model against the collected experimental survey data. First, the measurement model assessment has demonstrated the internal consistency and convergent validity of the reflective measurement indicators along with the discriminant validity of the reflective constructs. The measurement model assessment also involved confirming the convergent validity of the higher order formative construct and assessing the collinearity and significance of its formative indicators. The significance of the formative indicators has shown that convenience value, enjoyment value and perceived risk are significantly contributing to m-payment perceived value, regardless of previous m-payment experience and the proposed value-added service. On the other hand, monetary value is significantly contributing to m-payment perceived value among the nonadopters only, regardless of the proposed value-added service. Social value has shown an insignificant contribution in all experimental groups except for the nonadopters' instant balance group. These findings have fully confirmed hypotheses H2a, H2c, and H2e, while partially confirming H2b and H2c.

Having established the validity of the measurement model, the second step involved assessing the hypothesised structural model relationships and the model's predictive power. The PLS-SEM analysis has fully confirmed the positive effect of perceived value on m-payment use intention (H1), the positive effect of trust in provider on perceived value (H3), and the negative effect of attractiveness of alternatives on perceived value (H5). The results of the experiment have partially confirmed the positive effect of value-added service on perceived value (H4a) and the negative effect of value-added service on attractiveness of alternatives (H4c). On the other hand, the hypothesised positive effect of value-added service on trust in provider (H4b) was rejected by the data. In terms of the predictive power, the results show that the proposed model is well supported by the data as it explained between 47% and 69.9% of variance in use intention; and between 58.5% and 67.6% of variance in perceived value in the different experimental groups. An in-depth discussion of the above findings has highlighted some of the original contributions of this research that has empirically demonstrated (1) the extent of the impact of value-added service on m-payment perceived value; (2) the role of trust in provider as an antecedent to perceived value in the m-payment context; and (3) the influence of attractiveness of alternatives as an antecedent to perceived value and as a mediator between value-added services and perceived value towards promoting m-payment use intention. The next chapter further discusses these contributions along with their practical implications and offers suggestions for future research directions.

Chapter 7 Conclusion

7.1 Overview

This research was primarily conducted to provide empirical evidence of the effect of value-added services on m-payment adoption among consumers in the UK. m-payment has been marketed as a more convenient and secure payment instrument that benefits both consumers and merchants. However, previous studies have indicated that m-payment adoption has been slow among consumers in the UK (Slade, Williams, *et al.*, 2015; Hampshire, 2017) and worldwide (Johnson, *et al.*, 2018; Zhao, *et al.*, 2019). This has been attributed to consumers' perceptions of little or no value associated with using m-payment when compared to existing well-established payment methods. Accordingly, many researchers have concluded that m-payment should offer tangible benefits in the form of value-added services to increase m-payment value and promote adoption (Hayashi, 2012; de Reuver, *et al.*, 2015; Apanasevic, *et al.*, 2016; Madureira, 2017). Nevertheless, existing literature offers little evidence to support such a conclusion.

In order to fully understand the effect of value-added services on the perceived value of m-payment and behavioural intention, this study has developed a novel conceptual model that aims to (1) capture the relationship between value-added services as a form of added value and m-payment perceived value based on the assumptions of perceived value theory; and (2) account for other influential predictors of m-payment behavioural intention based on previous literature. The proposed initial research model included *trust in provider* and *value-added service* as antecedents of *perceived value*. *Perceived value* was conceptualised as a higher order construct that predicts m-payment *use intention* with the following lower order components: *convenience value*, *monetary value*, *enjoyment value*, *social value* and *perceived risk*.

A two-phase exploratory sequential mixed methods research design was employed to collect data from m-payment adopters and nonadopters in order to extend and evaluate the proposed conceptual model. In phase one, interviews were conducted to collect qualitative data to achieve contextual understanding of the proposed model's constructs. The inferences drawn from these qualitative data have led to (1) the extension of the proposed research model with *attractiveness of alternatives* as an antecedent to *perceived value*; and (2) the development of the quantitative measurement items. In phase two, a survey experiment was conducted to assess the extended research model using four exemplified value-added services, namely instant balance, loyalty card integration, spending tracker, and cashback. PLS-SEM was used to validate the measurement model and test the statistical significance of the relationships hypothesised within the model.

The outcomes of this research are discussed in the remainder of this chapter as follows. Section 7.2 outlines the main research findings. Sections 7.3 and 7.4 discuss, respectively, the theoretical

contributions and practical implications of the research. Section 7.5 provides a critical evaluation of this research and sets directions for future research. The chapter concludes with a summary in section 7.6.

7.2 Key Research Findings

The qualitative phase of this research has contributed to the development of the research model and operationalisation of its constructs. In addition, it provided insights that helped to explain the findings of the quantitative phase, which aimed to assess the proposed model through testing its underlying hypotheses. The key findings of this research are outlined as follows.

1. The benefit components of *convenience value* and *enjoyment value* were found to significantly contribute towards m-payment overall perceived value, regardless of previous m-payment experience and the offered value-added service. The contribution of enjoyment value was more pronounced than convenience value among the nonadopters, regardless of the value-added service offered. The same applied for adopters except for the instant balance and spending tracker groups, where convenience value made a higher contribution. On the other hand, the contribution of the *monetary value* component was only significant among the nonadopters, regardless of the value-added service offered. The most significant contribution of monetary value was seen in the loyalty card integration group whereas the least significant contribution was found in the cashback group. The *social value* component exhibited a nonsignificant contribution towards the perceived value of m-payment, regardless of previous m-payment experience and the value-added service offered.
2. The sacrifice value component of *perceived risk* was found to significantly contribute negatively towards overall perceived value of m-payment, regardless of previous m-payment experience and the value-added service offered. For nonadopters, the most significant contribution of perceived risk was found in the instant balance group, followed by spending tracker, loyalty card integration, and cashback groups. The most significant contribution of perceived risk in the adopters' groups was shown in the cashback group, followed by loyalty card integration, instant balance, and spending tracker groups.
3. As an overall higher order construct, *perceived value* was found to significantly explain m-payment use intention, regardless of previous m-payment experience and the value-added service offered. However, perceived value explained more variance in m-payment use intention among the nonadopters as compared with the adopters across all groups. For nonadopters, the largest effect was seen in the loyalty card integration group, followed by instant balance, cashback, and spending tracker groups. The largest effect in the adopters' groups was found in the instant balance group, followed by cashback, loyalty card integration, and spending tracker.
4. *Trust in provider* of m-payment demonstrated a significant positive effect on overall perceived value of m-payment, regardless of previous m-payment experience and the value-added service

offered. Such an effect was the result of the positive effect of trust in provider on the benefit components of value and the negative effect on the sacrifice component of perceived risk. Furthermore, trust in provider exhibited a relatively higher impact on the perceived value of m-payment among the nonadopters as compared to the adopters across all groups except for the cashback group, where the effect was slightly higher among the adopters.

5. *Attractiveness of alternatives* exhibited a significant negative effect on the overall perceived value of m-payment, regardless of previous m-payment experience and the value-added service offered. For nonadopters, the largest effect was demonstrated in the spending tracker group, followed by instant balance, cashback and loyalty card integration. On the other hand, the largest effect in the adopters' groups was shown in the loyalty card integration group, followed by spending tracker, instant balance, and cashback. In terms of the effect on the lower order components of value, attractiveness of alternatives demonstrated a significant positive effect on the benefit components and a significant negative effect on the sacrifice component across all nonadopter groups. The same applies for the adopter groups except for the loyalty card integration and cashback groups, where the effect was nonsignificant on social value in both groups and on monetary value in the cashback group.
6. The *value-added service* exhibited a significant positive effect on the perceived value of m-payment only among the nonadopters in the loyalty card integration group. This has led to a significant positive effect of value-added service on m-payment use intention mediated by perceived value. In terms of the effect on the lower order components of value, the value-added service demonstrated a significant positive effect on monetary value regardless of previous m-payment experience and the value-added service offered. On the other hand, the anticipated positive effect of the value-added service on convenience value was only shown in the adopters' loyalty card integration group. In addition, the value-added service exhibited a positive effect on enjoyment value among the nonadopters in the spending tracker group and the adopters in the loyalty card integration group. Against the expected negative effect, the value-added service demonstrated a positive correlation with perceived risk across all groups except for the nonadopters' cashback group, in which the association was negative, albeit nonsignificant.
7. Against the hypothesised positive effect, the *value-added service* demonstrated a negative correlation with trust in m-payment provider across all groups except for the spending tracker group of adopters and nonadopters, where the association was positive but nonsignificant.
8. The *value-added service* exhibited a significant negative effect on attractiveness of alternatives among the nonadopter groups of instant balance and loyalty card integration as well as the adopter groups of loyalty card integration and spending tracker. As a result, attractiveness of alternatives has served as a mediator between value-added service and perceived value of m-

payment. This mediation has led to a significant positive effect of value-added service on m-payment use intention in the above mentioned groups.

7.3 Research Contributions

This research introduces one of the first efforts to understand the effect of value-added services on m-payment adoption among consumers in the UK. There are several important areas where this study makes an original contribution to m-payment adoption research. In particular, it contributes to the advancement of m-payment adoption theories with a focus on understanding how value-added services impact consumers' perceptions of value and other pivotal predictors of m-payment use intention. The main theoretical contributions of this research are outlined as follows.

- **Understanding M-Payment Perceived Value:** The literature review discussed in Chapter 2 revealed inadequate understanding of the concept of perceived value in the m-payment context. Existing limited research on the perceived value of m-payment (e.g. Cocosila and Trabelsi, 2016; de Kerviler *et al.*, 2016) has been mostly quantitative and focused on identifying statistical relationships. As a concept, several researchers have emphasised the subjective nature of value, which differs depending on individual perceptions and use scenarios (Woodruff, 1997; Eggert and Ulaga, 2002). This study advances knowledge about m-payment value through offering an in-depth contextual analysis of its various components as perceived by m-payment adopters and nonadopters. In addition to offering a rich description of the way consumers recognise value in the m-payment context, this study also provides insights into how consumers' perceptions of value are affected by the influential factors of trust in provider and attractiveness of alternatives. Driven by evidence from qualitative data, the study contributes to theory development by demonstrating the application of mixed methods research design to extend the research conceptual model and guide the selection of the model's measurement items.
- **Analysing Perceived Value Conceptualisations in Technology Adoption Research:** Several studies were conducted to review the different approaches used to conceptualise perceived value in marketing and social psychology research (e.g. Sánchez-Fernández and Iniesta-Bonillo, 2007; Zauner *et al.*, 2015). However, little effort has been made to review the application of such approaches in technology adoption research. As part of the conceptual model development, this study provided a review of technology adoption literature (sections 2.8 and 2.9) that specifically employed perceived value as a theoretical foundation. The theoretical contribution of this review lies in (1) achieving a profound understanding of the relevance of perceived value in predicting behaviours towards technology; and (2) offering guidance for choosing a perceived value modelling approach that optimally aligns with the research objectives.

- **Development of a Novel Conceptual Model:** The key theoretical contribution of this research is the development of a novel conceptual model that captures the effect of value-added services on m-payment adoption in the presence of other influential predictors, such as perceived value, trust in provider, and attractiveness of alternatives. As discussed in section 2.11, previous studies (Augsburg and Hedman, 2014; Balachandran and Tan, 2015) have investigated the effect of value-added services using traditional technology adoption models that were originally founded to study technology adoption in organisational context. Furthermore, the role of known influential predictors of m-payment behavioural intentions was largely overlooked in these studies, rendering the results about the impact of value-added services questionable. The proposed model of this study not only accounts for important m-payment adoption predictors but also addresses the added value concept through employing the assumptions of perceived value theory. The model demonstrated better performance in terms of its predictive power for nonadopters, explaining 62.4% to 69.9% of variance in use intention as compared to 47% to 57.2% for adopters across all groups. As compared to previous studies, the proposed model exhibited a considerably better performance than Balachandran and Tan's (2015) model, which extended DOI theory with value-added services among other factors and explained 34.1% of variance in use intention. The proposed model has also outperformed Slade, Williams, *et al.*'s (2015) model, which employed UTAUT2 to investigate proximity m-payment adoption in the UK using a sample of nonadopters and explained 58.4% of variance in behavioural intention. The relatively high predictive ability of the proposed model, given the model parsimony, demonstrates the relevance of perceived value as a robust theoretical foundation for predicting consumer behavioural intentions towards technologies in general and m-payment specifically.
- **In-depth Analysis of Value-Added Services and Perceived Value:** The literature review conducted in Chapter 2 revealed a scarcity of research efforts to understand the effect that value-added services have on the value perceptions of a core service. This study provides empirical evidence of such an effect both at the higher order abstract level of perceived value and at the lower order level of benefit and sacrifice components. In addition, the quantitative findings of this study are based on an experimental research method to assess the effect of value-added services towards m-payment perceived value and use intention. More specifically, unlike observational surveys used in almost all m-payment adoption research, this study draws upon a survey experiment to establish causal inferences about the impact of value-added services on the perceived value of m-payment. This study thus addresses one of the most critical evidence gaps relevant to addressing the lack of understanding mechanisms for adding value in the m-payment context. It does so by illustrating that increasing value perceptions of one or more benefit components of value through value-added services does not necessarily increase perceptions of added value at an overall abstract level. This is

because value-added services could potentially increase perceptions of risk and, consequently, inhibit perceptions of the overall added value. This contribution also advances theory by confirming the validity of the formative nature of perceived value as a trade-off concept in the m-payment context.

- **Highlighting New Antecedents of Perceived Value:** By confirming the positive effect of trust in provider and the negative effect of attractiveness of alternatives, this study appears to be the first to provide evidence on the impact of these factors on the perceived value of m-payment. These outcomes highlight the importance of the above mentioned factors in predicting perceived value in the m-payment context. They also provide a useful guideline for future m-payment research which employs a value-based approach to investigate consumer behaviours. More importantly, the inclusion of attractiveness of alternatives has provided a further insight into how consumers assess the added value of value-added services. This is evidenced in the mediating effect of attractiveness of alternatives between value-added services and the perceived value of m-payment. Specifically, the mediating effect suggests that consumers' assessment of the added value of an emerging service or technology is largely influenced by the extent to which it is perceived to be more attractive than existing competitor services. Therefore, this study introduces another important advancement to m-payment adoption research as it shows the necessity of including attractiveness of alternatives in adoption models that aim to investigate added value.

7.4 Practical Implications of this Research

The qualitative and quantitative findings of this research suggest various practical implications and guidelines for m-payment providers to consider in order to increase m-payment value and promote adoption. Suggested guidelines for adding value through m-payment value-added services are discussed as follows.

- **Considering the Value Propositions of Existing Payment Methods:** This research has demonstrated that consumers are likely to evaluate the added value received from an augmented m-payment service based on their comparative assessment of its additional features against the benefits of existing competitor services. A recent study confirms this implication by suggesting that m-payment growth depends on the extent to which consumers understand how and why adopting m-payment is beneficial as compared to payment cards (Jocevski, *et al.*, 2020). Therefore, m-payment providers should carefully consider the value propositions offered by mainstream payment methods and develop m-payment value-added services that boost differentiation.
- **Integrating Utilitarian Functionalities**: The findings of this research have shown that embedding additional features that allow consumers to achieve more with the m-payment app beyond the core payment service could add value and promote adoption. The integration

of additional services that tackle issues associated with existing payment scenarios (e.g., use of loyalty cards) has proved to be essential in recognising the added value of m-payment from a consumer's perspective. Since different consumers have different needs, m-payment providers should promote consumer engagement to provide value-added services that meet the market needs.

- **Fostering Hedonic Cues:** From consumers' perspective, hedonic aspects are associated with a satisfactory experience in terms of ease of use, speed of completing transactions, and the interactivity of the m-payment app. Thus, in order to enhance hedonic perceptions through value-added services, m-payment providers should carefully consider the app user experience and ensure that the added features do not affect the convenience of the core payment functionality. Furthermore, the findings indicated that consumers who had previous m-payment experience enjoy the app notifications they receive when making a payment. Therefore, associating sensory-provoking cues, such as visual, auditory, and haptic notifications with value-added services could enhance emotional perceptions and lead to favourable outcomes.
- **Investing in Marketing Strategies:** This research has shown that perceptions of risk, such as theft and privacy concerns of sensitive information abuse, could have adverse effects on consumers' assessment of added value. With this in mind, m-payment providers should employ effective marketing and communication strategies to reassure consumers about the security of their augmented m-payment solutions and enhance perceptions of trust. In addition, investing in marketing campaigns to highlight the value propositions of their augmented m-payment solutions as compared to mainstream payment methods could lead to increased consumers' awareness and promote adoption.

7.5 Critical Evaluation and Future Research Directions

This research has provided an in-depth investigation on the effect of value-added services on m-payment adoption, thus making several theoretical contributions to knowledge and offering useful practical implications for m-payment providers. However, despite these contributions, some limitations are associated with this research. But such limitations provide opportunity for setting future research directions.

First, the findings of the current study are mainly based on instances of value-added services suggested by previous research, in addition to one service suggested by the participants of the qualitative study, as a potential means for adding value. Although these findings have illustrated the dynamics of adding value through these services, they have also shown that different consumers have different needs due to the highly subjective nature of value. This implies that a given value-added service might not fit the needs of all consumers. A possible future research direction may utilise the proposed model to elicit value-added services based on the identified significant determinants of

value. For example, identifying potential value-added services that specifically enhance utilitarian or hedonic benefits, or decrease the sacrifice of risk, would be an interesting advancement.

Second, this study is conducted in the context of the UK, meaning that the findings might not be generalisable to other countries. Previous research suggests that consumers' perceptions of value are specific to their social and cultural backgrounds (Yang and Jolly, 2009). For instance, the findings of this study indicate that social value has no significant contribution towards m-payment perceived value. In contrast, previous studies conducted in Canada (Cocosila and Trabelsi, 2016) and France (de Kerviler, *et al.*, 2016) suggest that social value is a significant determinant of m-payment value. Therefore, validating the proposed research model across different cultural backgrounds would be another beneficial research direction.

Third, this research focuses on investigating the effect of value-added services on m-payment adoption from a consumers' perspective. Although consumers' behavioural intentions play an important role for the success of m-payment, understanding the perspectives of other parties involved in the provision of m-payment value-added services, such as merchants, financial institutions, and regulatory bodies, would be useful. For example, this study has shown that consumers with no previous m-payment experience have perceived an added value from augmenting m-payment with the instant balance value-added service as compared to existing payment instruments. Offering such value-added service would require collaboration between m-payment app providers and financial institutions. In order to understand its full potential towards promoting m-payment adoption, future research is encouraged to investigate issues associated with such collaboration, such as technical feasibility, regulatory policies, stakeholders' interests, etc.

Fourth, in order to achieve the model parsimony and adhere to the minimum sample size requirement given the limited research budget, factors related to demographic characteristics, such as age and gender; and personal traits, such as innovativeness and self-efficacy, were not included in the model. The aim of this research was to provide an exploratory investigation on the effect of value-added services on consumers' intention to adopt m-payment, regardless of their individual characteristics. Therefore, extending the proposed model to account for these characteristics in future research would be useful to assess their impact on the significance of the model's constructs.

Finally, due to resource constraints, the survey instrument employed in the quantitative phase of this study was adapted from scale items in the literature based on the findings of the qualitative phase. Adapting previously validated items is a common practice in information systems research to minimise potential bias issues associated with self-reported data. However, m-payment adoption research would benefit from future research that aims to design and validate new scale items that specifically capture the concept of value and its antecedents in the context of m-payment. A possible

research direction may utilise the qualitative findings of this study as a point of departure to design new scale items.

7.6 Summary

This chapter has concluded this thesis with an overview of the research aim and the methodological approach employed to achieve it. The key findings of this research indicate the significance of the value components of convenience, monetary, enjoyment, and perceived risk in shaping the perceptions of consumers with no previous m-payment experience towards the overall value of m-payment. In addition, consumers' perceptions of added value could be achieved directly through increasing perceptions of benefits as a result of augmenting m-payment with value-added services. However, consumers seem to place more emphasis on whether such added value is beneficial as compared to existing payment methods. In addition, the value-added services' ability to decrease perceptions of risk and, consequently, increase perceptions of trust in m-payment providers would likely enhance perceptions of added value and promote adoption. By drawing on the abovementioned key findings, this study contributes to m-payment adoption research in several aspects through developing a novel conceptual model that captures the impact of value-added services on the factors that influence behavioural intentions towards m-payment. The model also highlights potential directions through which value-added services may enhance consumers' perceptions of m-payment value, thereby offering useful guidelines for m-payment providers to promote adoption.

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Appendices

Appendix 4.1 Interview Guide

Section 1: Introduction

First of all thank you for accepting my invitation and coming for this interview, which is part of my research study that focuses on investigating the factors that influence the intention to use mobile phones for payment for goods or services instead of using other payment methods such as cash and cards. These factors are related to the positive value perceptions of convenience, enjoyment, monetary, trust and social values as well as the negative value perceptions associated with risks and cost. The interview will be audio-taped and access to the recording will be strictly limited to the researcher and the supervisors of this study. No personal information will be needed, and your identity will be completely anonymised. The whole purpose of this interview is to discuss your views about using mobile payment; there is no right or wrong answer.

Are you OK to proceed?

Participant information

1. How old are you?
2. Are you working or studying?
3. Have you ever used your mobile phone to pay for your shopping in-store?
4. Have you tried shopping using your mobile phone apps or web browser? If yes, how you usually pay?

Section 2: Mobile payment adoption factors

Convenience Value: This research defines convenience as the utility you perceive from the ease of registration and use of mobile payments as a service accessible anytime and anywhere.

5. How do you perceive the convenience of mobile payments?

Monetary Value: is defined as the utility you perceive from the money savings resulted from using your mobile to pay for your shopping.

6. Do you see any monetary value from using your mobile to pay compared to using card or cash?

Enjoyment Value: the value derived from the feelings associated with the interaction with the mobile payment application.

7. Given the chance to pay using your mobile phone for your shopping, how do [would] you feel about this experience? Would you enjoy it?

Social Value: the utility derived from being part of a social group that uses mobile payment.

8. Do you feel that using your mobile to pay would make you more accepted among your friends or give some good impression on other people?

Perceived trust: the value derived from the belief that the provider of the payment application is trustworthy.

9. How do you perceive that a particular provider is trustworthy?
10. Which mobile payments service provider that you would consider as the safest to handle and process your payment and account information?

Perceived risk: This study defines perceived risk as the negative user belief of uncertainty regarding the security of their information and the reliability of the underlying technology (including the software, the mobile phone as a device, and the network).

11. What are the risks that you see associated with using mobile payments applications?
12. Would you consider using an application provided by a trustworthy provider as less risky?
13. Thinking about any extra cost that you may incur as a result of using your mobile to pay for shopping, do you see any extra cost associated with using your mobile as a payment method compared to using card or cash?

Section 3: Mobile payment with value-added services

14. Now let's assume that a new mobile payments application that allows you to make in-store and online payments is available and offers some additional services that I will describe in a bit, but before that I want to ask you what would be the first thing that you will consider with this new application in order to proceed to check the offered services?

Instant balance: Assuming that the new application offers you an extra functionality that enables you to instantly see the balance of your card or account before making the payment,

15. How do you perceive this in terms of

- Convenience value
- Monetary value
- Enjoyment value
- Social value
- Trust
- Risk

Loyalty cards integration: Let's assume that the new application offers you another extra functionality that enables you to add your loyalty cards and use them without the need to carry the physical card,

16. How do you perceive this in terms of

- Convenience value
- Monetary value
- Enjoyment value

- Social value
- Trust
- Risk

Cashback: Assuming that the new application offers you a cashback percentage on transactions you make with specific stores using the new mobile payments application,

17. How do you perceive this in terms of
- Convenience value
- Monetary value
- Enjoyment value
- Social value
- Trust
- Risk
18. If I ask you to rank these services (balance checking, loyalty cards integration and cashback) in terms of their impact on your intention to use this new mobile payment application, which service comes first and why?
19. Overall, do you think that the advantages you would receive from using your mobile to pay would outweigh the disadvantages to the point that encourages you to use it?
20. Can you think of any additional services that would be useful to you to be added to this new mobile payment application? And why?
21. Would you like to add any comments or ask any questions you have?
22. Finally, I composed a mailing list for participants who wish to receive a copy for a summary of the findings of this study at the end. Do you wish to subscribe to this list? If yes, I will send you the link to do so.

Thank you very much for your time and valuable contribution.

Appendix 4.2 Survey Experiment Questionnaire

[Section 1: Participant Information Sheet**]**

Thank you for your interest in this research. Please read the following information before deciding if you would like to take part.

About this study

This study is part of a PhD research at the School of Engineering, Computing and Mathematics, Oxford Brookes University.

Study subject

An investigation into the factors influencing consumer adoption of mobile payment in the UK

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What is the purpose of the study?

The main aim of this study is to understand the different value perceptions of contactless mobile payment as an alternative payment method that could be used instead of using cards or cash for in-store payments.

Why have I been invited to participate?

You are invited to take part if you are 18 or older and live in the UK and you are using a smartphone. It doesn't matter if you have used mobile payment in the past or not, you can still take part.

Do I have to take part?

Participation is completely voluntary. If you do decide to take part, then after reading this information sheet you will be redirected to an online survey. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

You will need to answer the questionnaire of the online survey. The questionnaire begins with an illustration of the mobile payment service and asks you to answer questions that reflect your views about this service. The questionnaire is expected to take about 7 minutes to finish.

What are the possible disadvantages and risks of taking part?

There are no direct disadvantages or risks associated with you taking part in this research.

What are the possible benefits of taking part?

Your participation will invaluably contribute to the success of this research in achieving the aim of broadening the understanding of the factors that affect the UK consumers' decisions to adopt a new mobile payment method.

Will what I say in this study be kept confidential?

All the information collected from you will be kept strictly confidential and will only be used for the purpose of this research and stored in a secure electronic form accessible exclusively by the researcher. This is an anonymous survey meaning that no information relating to you will be recorded anywhere.

Who has reviewed the study?

The research has been approved by the University Research Ethics Committee at Oxford Brookes University. If you have any concerns about how this study has been conducted, you can contact the supervisory team or the Chair of the University Research Ethics Committee on ethics@brookes.ac.uk

If you have any further questions about this study, please contact the principal investigator on the address above.

If you have read the above information sheet and would like to participate, please click Next to start the survey. Otherwise, please close this browser page and cancel your participation in this study from your Prolific page.

[Section 2: Stimuli**]**

[Common to all Groups]

Please read the following illustration carefully before proceeding to questions

Mobile payment

In this study, mobile payment refers to a payment service offered through a mobile payment app. The app allows you to store your payment cards information so that you can pay for your purchases by tapping or waving your phone at the payment terminal as illustrated in the image above. Multiple payment cards can be added to the app that allows you to choose which card to pay with. The phone transmits your chosen card information through NFC (Near Field Communication) waves to the payment terminal and completes the payment with the following steps involved in the process:

1. Holding the phone to the payment terminal, this step automatically activates the mobile payment app
2. Authenticating the payment using the method normally used to unlock the phone, e.g. pass code, fingerprint, etc.

Current examples of mobile payment apps that use Near Field Communication technology (NFC) payment technology include Apple Pay, Google Pay, Samsung Pay, etc.

[Control Group]

Please answer all the following questions based on your perceptions of using mobile payment

[Instant Balance Group]

Future mobile payment apps will be able to offer **additional services** along with the payment service. Assume that you have access to a new mobile payment app that offers the following additional service:

Instant account balance
This service gives you the option to display the card account balance instantly before and after making a payment.

Please answer all the following questions based on your perceptions of using a mobile payment app offering the instant account balance additional service

[Loyalty Cards Integration Group]

Future mobile payment apps will be able to offer **additional services** along with the payment service. Assume that you have access to a new mobile payment app that offers the following additional service:

Loyalty cards integration

This service enables you to store your loyalty cards along with your payment cards so that you no longer need to scan your physical loyalty card when you pay.

Please answer all the following questions based on your perceptions of using a mobile payment app offering the loyalty cards integration additional service

[Spending Tracker Group]

Future mobile payment apps will be able to offer additional services along with the payment service. Assume that you have access to a new mobile payment app that offers the following additional service:

Spending tracker
This service offers you a chart of expenses that categorises how much you spent on shopping, restaurants, transportation, etc. in a specified period.

Please answer all the following questions based on your perceptions of using a mobile payment app offering the spending tracker additional service

[Cashback Group]

Future mobile payment apps will be able to offer additional services along with the payment service. Assume that you have access to a new mobile payment app that offers the following additional service:

Cashback
This service allows you to get exclusive offers and discounts on payments you make through the mobile payment app.

Please answer all the following questions based on your perceptions of using a mobile payment app offering the cashback additional service

[Section 3: Measurement Items**]**

Mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] is convenient because the phone is usually with me

- o Strongly disagree
- o Disagree
- o Somewhat disagree
- o Neither agree nor disagree
- o Somewhat agree
- o Agree
- o Strongly agree

Mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] is convenient because I can use it anytime

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] is convenient because it would save me time

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] is convenient because it would minimise my effort

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Compared to traditional payment methods, mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] is more convenient

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree

- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would help me to do my shopping at a lower financial cost

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would help me to save money

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would help me to spend less

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would help me to better manage my expenses

- Strongly disagree

- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would help me to feel acceptable among my friends

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would improve the way I am perceived by my peers

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

The fact I use mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would make a good impression on other people

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would give me social approval

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] would make me feel good

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I would feel relaxed about using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service]

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I would enjoy using mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service]

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree

- Agree
- Strongly agree

I do not feel totally safe providing personal private information over mobile payment apps

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I am worried about using mobile payment apps because other people may be able to access my account

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Using a mobile payment app would lead to a loss of privacy for me because my personal information would be used without my knowledge

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

The mobile payment app might not perform well and create problems with my payments

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree

- Somewhat agree
- Agree
- Strongly agree

The likelihood that there will be something wrong with the performance of the mobile payment app or that it will not work properly is high

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

The security measures built into mobile payment apps are not strong enough to protect my finances

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I believe that overall riskiness of mobile payment apps is high

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I believe mobile payment service providers keep their promise

- Strongly disagree
- Disagree
- Somewhat disagree

- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I believe mobile payment service providers keep customers' interests in mind

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

The services offered by mobile payment service providers meet my needs

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I believe mobile payment service providers will do everything to secure the transactions for users

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

I believe mobile payment service providers are trustworthy

- Strongly disagree
- Disagree
- Somewhat disagree

- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Compared to mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service], there are other payment methods (cards, cash, etc.) with which I would probably be equally or more satisfied

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

An alternative payment method (cards, cash, etc.) is more convenient than mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service]

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

My needs could easily be fulfilled by an alternative payment method

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

To my knowledge, another payment method is close to ideal

- Strongly disagree

- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Taking all the pros and cons into consideration, the use of mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] is beneficial to me

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Compared to other payment methods, mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] is worthwhile to me

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Overall, the use of mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] gives me good value

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Assuming that I had access to mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service], I would intend to use it

- o Strongly disagree
- o Disagree
- o Somewhat disagree
- o Neither agree nor disagree
- o Somewhat agree
- o Agree
- o Strongly agree

Given that I had access to mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service], I predict that I would use it

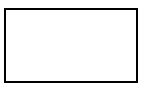
- o Strongly disagree
- o Disagree
- o Somewhat disagree
- o Neither agree nor disagree
- o Somewhat agree
- o Agree
- o Strongly agree

Given a chance, I plan to use mobile payment [with instant balance/loyalty cards integration/spending tracker/cashback service] in the future

- o Strongly disagree
- o Disagree
- o Somewhat disagree
- o Neither agree nor disagree
- o Somewhat agree
- o Agree
- o Strongly agree

[Section 4: Demographic Information**]**

In what year were you born? (enter 4-digit birth year; for example, 1976)



What is your gender?

- Female
- Male
- Other

What is your occupation?

- Employed
- Self-employed
- Student
- Pensioner
- Unemployed

What is your highest level of education?

- Undergraduate degree (BA/BSc/etc.)
- College / A Levels
- Secondary school / GCSE
- Graduate degree (MA/MSc/MPhil/etc.)
- Doctorate degree (PhD/MD/etc.)
- No formal qualification

How long have you been using mobile payment as an alternative payment method to cards and cash?

- Never used
- Less than 3 months
- Less than 6 months
- Less than a year
- 1-2 years
- 2-3 years
- More than 3 years

How often have you been using mobile payment as an alternative payment method to cards and cash?

- Never
- Once a year
- Several times a year
- Once a month
- Several times a month

- Several times a week
- Several times a day

Approximately state the number of times you used mobile payment in the last one year

- 0 Times
- 1 - 10 Times
- 11 - 20 Times
- 21 - 50 Times
- 51 - 100 Times
- 101 - 200 Times
- More than 200 times

Thank you very much for completing this questionnaire.

Appendix 5.1 Qualitative Sample Demographics

Participant ID	Age Group	Gender	Occupation	Adopter/Nonadopter
P1	25-34	Female	Student	Adopter
P2	25-34	Male	Employee	Adopter
P3	25-34	Male	Student	Nonadopter
P4	25-34	Female	Employee	Nonadopter
P5	25-34	Female	Employee	Nonadopter
P6	55-60	Male	Retired	Nonadopter
P7	25-34	Female	Student	Adopter
P8	25-34	Male	Student	Adopter
P9	45-54	Male	Employee	Adopter
P10	18-24	Male	Student	Nonadopter
P11	18-24	Male	Student	Nonadopter
P12	25-34	Male	Student	Nonadopter
P13	25-34	Male	Employee	Nonadopter
P14	25-34	Female	Student	Nonadopter
P15	18-24	Male	Employee	Nonadopter
P16	35-44	Male	Employee	Nonadopter
P17	25-34	Male	Employee	Adopter
P18	25-34	Female	Employee	Nonadopter
P19	35-44	Male	Employee	Nonadopter
P20	18-25	Male	Student	Adopter
P21	35-44	Male	Student	Nonadopter
P22	35-44	Male	Self-employed	Nonadopter
P23	35-44	Female	Employee	Nonadopter

Appendix 6.1 HTMT Results of Combined Datasets

CVAS1 - Nonadopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.552							
ENJ	0.593	0.709						
MON	0.427	0.457	0.546					
RSK	0.504	0.340	0.547	0.198				
SOC	0.380	0.380	0.436	0.355	0.168			
TRU	0.347	0.641	0.667	0.356	0.650	0.329		
UI	0.654	0.664	0.836	0.486	0.620	0.362	0.655	
VAS	0.136	0.040	0.064	0.320	0.018	0.021	0.035	0.079

CVAS2 - Nonadopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.572							
ENJ	0.616	0.728						
MON	0.489	0.461	0.515					
RSK	0.522	0.314	0.567	0.231				
SOC	0.307	0.384	0.460	0.382	0.134			
TRU	0.485	0.630	0.728	0.369	0.616	0.318		
UI	0.669	0.661	0.840	0.493	0.634	0.334	0.694	
VAS	0.148	0.098	0.074	0.355	0.024	0.084	0.040	0.095

CVAS3 - Nonadopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.542							
ENJ	0.627	0.722						
MON	0.459	0.492	0.597					
RSK	0.495	0.300	0.527	0.263				
SOC	0.390	0.392	0.416	0.326	0.112			
TRU	0.407	0.658	0.669	0.393	0.624	0.241		
UI	0.647	0.650	0.802	0.489	0.560	0.340	0.639	
VAS	0.053	0.050	0.130	0.419	0.049	0.037	0.086	0.041

CVAS4 - Nonadopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.613							
ENJ	0.633	0.746						
MON	0.394	0.426	0.491					
RSK	0.519	0.335	0.531	0.283				
SOC	0.394	0.396	0.476	0.315	0.129			
TRU	0.487	0.704	0.677	0.377	0.603	0.306		
UI	0.654	0.663	0.821	0.461	0.591	0.369	0.707	
VAS	0.079	0.095	0.031	0.368	0.016	0.145	0.104	0.036

CVAS1 - Adopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.460							
ENJ	0.585	0.656						
MON	0.260	0.169	0.275					
RSK	0.570	0.294	0.441	0.091				
SOC	0.222	0.186	0.450	0.377	0.078			
TRU	0.376	0.553	0.723	0.149	0.578	0.204		
UI	0.582	0.711	0.817	0.112	0.434	0.200	0.585	
VAS	0.066	0.080	0.031	0.415	0.056	0.011	0.028	0.052

CVAS2 - Adopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.537							
ENJ	0.571	0.642						
MON	0.258	0.210	0.364					
RSK	0.588	0.236	0.500	0.077				
SOC	0.122	0.076	0.327	0.340	0.102			
TRU	0.297	0.421	0.616	0.152	0.512	0.247		
UI	0.577	0.624	0.748	0.127	0.472	0.074	0.570	
VAS	0.118	0.215	0.111	0.467	0.170	0.023	0.097	0.051

CVAS3 - Adopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.548							
ENJ	0.564	0.669						
MON	0.290	0.165	0.332					
RSK	0.530	0.362	0.571	0.143				
SOC	0.172	0.128	0.384	0.247	0.095			
TRU	0.353	0.561	0.696	0.242	0.601	0.162		
UI	0.563	0.645	0.741	0.111	0.454	0.076	0.536	
VAS	0.140	0.145	0.087	0.654	0.069	0.041	0.035	0.051

CVAS4 - Adopters								
Construct	**ALT**	**CON**	**ENJ**	**MON**	**RSK**	**SOC**	**TRU**	**UI**
ALT								
CON	0.466							
ENJ	0.470	0.648						
MON	0.194	0.123	0.395					
RSK	0.585	0.301	0.505	0.086				
SOC	0.104	0.127	0.379	0.450	0.046			
TRU	0.330	0.562	0.749	0.187	0.604	0.205		
UI	0.553	0.701	0.706	0.087	0.497	0.068	0.623	
VAS	0.049	0.086	0.087	0.423	0.106	0.038	0.053	0.064

Appendix 6.2 Construct Collinearity Statistics of Stage-One Model

Construct	VIF – Nonadopters				VIF – Adopters			
	CVAS1	CVAS2	CVAS3	CVAS4	CVAS1	CVAS2	CVAS3	CVAS4
TRU	1.116	1.223	1.152	1.229	1.129	1.093	1.105	1.103
VAS	1.019	1.026	1.006	1.010	1.005	1.025	1.014	1.003
ALT	1.130	1.246	1.147	1.218	1.132	1.095	1.120	1.100
CON	1.773	1.858	1.814	1.917	1.389	1.397	1.409	1.405
MON	1.395	1.360	1.469	1.283	1.148	1.172	1.101	1.248
ENJ	2.415	2.560	2.452	2.530	1.689	1.781	1.835	1.832
SOC	1.239	1.287	1.223	1.283	1.251	1.134	1.143	1.236
RSK	1.355	1.403	1.322	1.347	1.179	1.253	1.309	1.261